

July 2017

Small Fields, Big Expectations: Can India's Discovered Small Field Rounds Deliver?

1. Introduction

In May 2016, the Indian government launched a bidding round for Discovered Small and Marginal Fields (DSF), offering 46 contract areas (containing 67 oil and gas fields) across nine sedimentary basins. This was part of a push to attract investments into the development of oil and gas discoveries in fields previously held by India's National Oil Companies (NOCs) as part of their 'legacy' assets.¹ These assets had remained undeveloped because they were deemed to be marginal, and thus below the economic threshold for development (Offshore Energy, 2017). The DSF round was especially significant as it was India's first bidding round for acreage in six years² (during which time upstream activity has been in decline), and it was intended to be a preamble to the country's new open acreage licensing system (the Hydrocarbon Exploration Licensing Policy – HELP)³ under which the basis of the upstream fiscal regime has been fundamentally changed from a profit-sharing contract to a revenue-sharing contract. Further DSF rounds are also planned (PIB, 2017a;b).

This Insight explores the following questions pertaining to the DSF round: what is the purpose and significance of the DSF round within India's wider policy on energy? Has the outcome of the first DSF round been successful relative to historical performance? And, does the new regime adequately address the weaknesses which have encumbered India's previous attempts at boosting upstream exploration and production?⁴ The Comment is structured in three parts: Section 2 assesses the outcomes of the DSF round, using some broad parameters. Section 3 contains a discussion on specific areas which need further attention in order for the regime to fulfil its intended objectives of production enhancement. In Section 4 the Insight concludes by setting out some broad options available to India in relation to future DSF rounds, which could be investigated further.

¹ Awarded under the 'Nomination Regime' – India's first, and NOC-centric, upstream fiscal regime (see Sen, 2016). The two NOCs are Oil and Natural Gas Corporation (ONGC) and Oil India Limited (OIL).

² Since the last (ninth) round of the now-erstwhile New Exploration Licensing Policy (NELP) Regime in 2009/2010. See Sen and Chakravarty (2013) for an analysis of NELP.

³ The first round of HELP was launched in June 2017. See Sen (2016).

⁴ See Sen and Chakravarty (2013); Sen (2016).

2. Assessing the performance of the DSF round

The DSF regime represents a significant departure from India's previous upstream fiscal regimes as seen in the broad comparison of salient features presented in Table 1 below.⁵ Its distinguishing features in this regard include:

- Sharing of revenues from production (as opposed to profit sharing under previous regimes);
- No cost recovery (which has hitherto featured in every regime);
- A single licence for conventional and unconventional hydrocarbons;
- No restrictions on exploration activity through the entire contract period (20 years, or the economic life of the field);
- No previous experience required in operating or producing upstream assets; and,
- An emphasis on revenues (80 per cent) in the weighting of the only two biddable parameters (namely the revenues shared with the government at the 'lower' and 'higher' production points, and the work programme [20 per cent]).

The features above have been geared towards simplifying the administration of upstream contracts, as it is now acknowledged that India does not have the regulatory capacity to administer profit-sharing contracts, particularly with regards to the monitoring of capital expenditures, as demonstrated by past experience (see CAG 2011; Sen and Chakravarty, 2013). Many of the above features also feed into India's recently announced open acreage licensing policy (HELP) (see NIO, 2017), with the important distinction that while the HELP is geared towards previously unexplored areas, the DSF round represents potential discoveries in fields previously owned by NOCs, which need to be brought into production. In other words, while the HELP aims at boosting exploration, the DSF round is primarily targeted at 'production enhancement' or scaling up production, in the short and medium-term.

The success of the DSF round is difficult to gauge as these are early days, but two broad parameters are typically used to assess the performance of bidding rounds. A first measure relates to the *competitiveness* of the round – in other words, the number of companies that participated, the bids received for various blocks, and the types of companies (in terms of scale, ownership, and experience) which participated. A second measure relates to the *objectives* of the round, and whether the winning companies have the capability to work within the given fiscal system to deliver these objectives.

⁵ The table excludes the 'Nomination Regime' – India's earliest fiscal system that was geared exclusively to the NOCs with no private participation. For details see Sen (2016). The table also distinguishes between two time periods for NELP, as major changes were made within the regime during the second time period (2006–10).

Table 1: Salient features of the DSF versus previous upstream regimes

	Pre-Liberalization	Post-Liberalization		
	Discovered Fields and pre-NELP	NELP Rounds I–V (1999–05)	NELP Rounds VI–IX (2006–10)	DSF (2016)
Contract Type	Profit Sharing	Profit sharing after recovery of capex	Profit sharing after recovery of capex	Revenue sharing (net of royalty) from onset of production
Basis of Profit or Revenue Split	Post Tax Investment Multiple or Post Tax Rate of Return	Profit sharing based on six-tiered pre-tax investment multiple (1.5 and below, 1.5–2.0, 2.0–2.5, 2.5–3.0, 3.0–3.5, and 3.5 and above); biddable	Profit sharing based on linear interpolated sliding scale pre-tax investment multiple between lower and upper thresholds (1.5 and below and 3.5 and above); biddable	Revenue sharing based on lower revenue point (\leq US\$0.01mn) and higher revenue point (\geq US\$1mn) with linear interpolated sliding scale; biddable
Other Fiscal Criteria	Cost recovery up to 100%	Biddable cost recovery up to 100%	Biddable cost recovery up to 100%	No cost recovery
Signature Bonus	None	None	None	None
Work Programme	-	Minimum work programme and expenditure commitment (biddable)	Minimum (biddable) plus mandatory work programme	Biddable work programme
Licence for exploration	-	Separate licences required; restrictions on exploration period	Separate licences required; restrictions on exploration period	Single licence for conventional and unconventional hydrocarbons; exploration can be carried on throughout the contract period
Financial Criteria	-	Net worth, debt–equity ratio and profit-before-tax	Net worth greater than value of work programme	Net worth greater than value of work programme
Technical Criteria	-	Acreage held, previous reserve accumulation/production, previous operatorship experience (for deep-water blocks)	Previous experience in operatorship or production	No previous experience required
FDI or Participating Interest by NOCs	Up to 40% participating interest by NOCs based on field size	100% FDI	100% FDI	100% FDI

NOC Carried Interest	30% exercisable on commercial discovery	None	None	None
Pricing and Sale of Oil and Gas	First right of government on purchase of 100% of oil and gas production	Marketing freedom for domestic sales; gas subject to government's gas utilization policy; gas price discovery	Marketing freedom for domestic sales; gas subject to government's gas utilization policy; gas price discovery ⁶	Marketing freedom for domestic sales; pricing freedom for gas (based on international benchmarks)
Oil 'Cess'	Changed in 2016 from ₹900/tonne to <i>ad valorem</i> rate of 20%	None	None	None
Customs Duty	None	None	None	None
Balance of Biddable Incentives	-	Work programme given a higher weighting (55–60%) in bid evaluation relative to other (financial, technical, fiscal) criteria	Fiscal terms (profit share and cost recovery) given a higher weighting in bid evaluation (45–60%) relative to other criteria; later equalized with work programme for NELP rounds VIII and IX	Revenue share given 80% of weighting and work programme given 20% of weighting in bid evaluation

Source: Sen and Chakravarty (2013), CAG (2011)

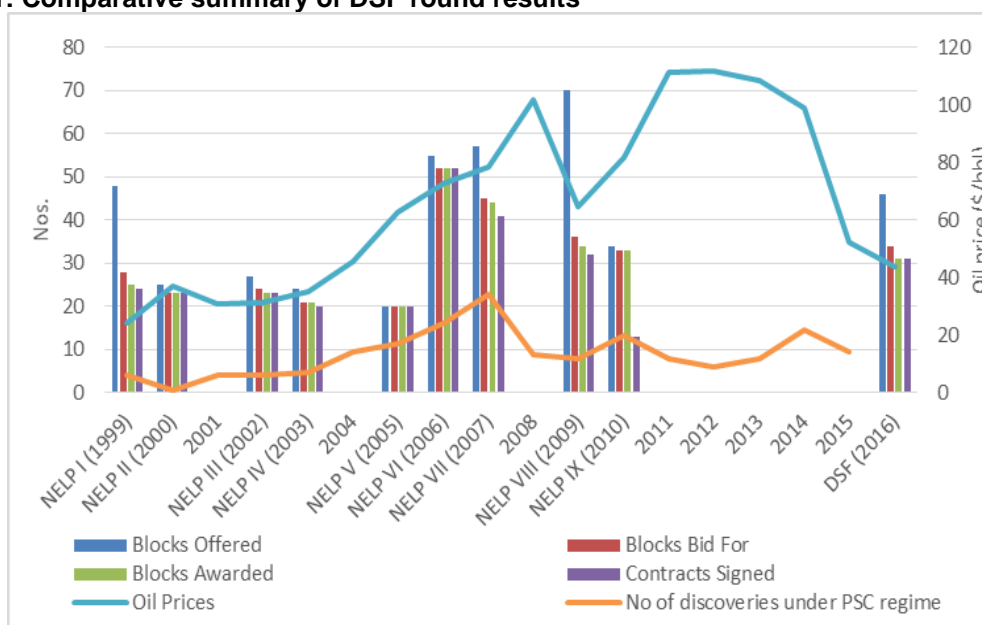
2.1 Was the DSF round competitive?

The competitiveness of the DSF round can be assessed through several standard performance indicators described in the literature (Sen and Chakravarty, 2013). Figure 1 provides a summary of the DSF round, set in comparison with previous (NELP) auction rounds, in which blocks have been awarded on the basis of first-price sealed bid auctions,⁷ and it includes the number of blocks on offer, the number of blocks for which bids were received, the number of blocks awarded (to the highest bidder), and the number of contracts signed. These are plotted against world oil prices to illustrate the influence of external factors on the responses to bidding rounds. Two attributes are commonly used to describe the degree of competition in oil and gas lease auction markets: the number of blocks attracting bids – indicative of companies' participation, and the number of bids per block (seen in Figure 2) – indicative of the competitiveness of the auction round.

⁶ Significant controversy was generated over gas price discovery under the NELP. For details see Jain (2012).

⁷ See Sen and Chakravarty (2013) for a discussion on different auction formats.

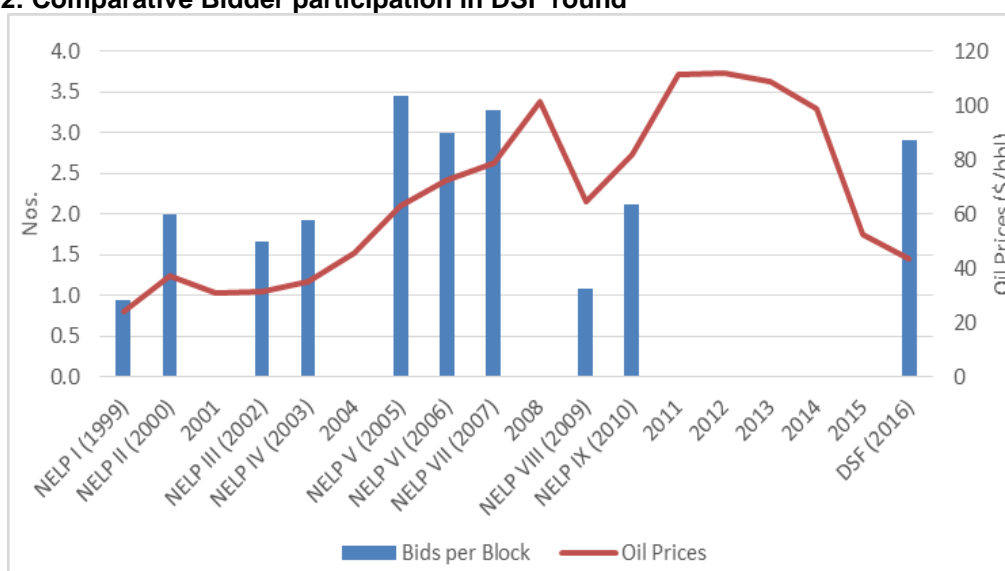
Figure 1: Comparative summary of DSF round results



Source: Sen and Chakravarty (2013); PIB (2016)

As seen in Figure 1, on average, around 80 per cent of blocks on offer have attracted bids under the NELP rounds. In comparison, roughly 74 per cent of blocks on offer (34 out of 46 contract areas) attracted bids in the DSF round; thus while the DSF round performed slightly below average by Indian standards (although higher than the historic low of 50 per cent in NELP-VIII), ‘successful’ auctions (such as those in the US Gulf of Mexico) attract bids far in excess of the number of blocks on offer (Sen and Chakravarty, 2013). However, the response to auction rounds is also subject to factors other than just the fiscal regime – such as the perceived ‘prospectivity’ (hydrocarbon resource potential) of a country at that point in time (evidenced by the number of discoveries at the time of each NELP bidding round, shown by the lower line in Figure 1), and the prevailing oil price trend (upper line in Figure 1).

Figure 2: Comparative Bidder participation in DSF round



Source: Sen and Chakravarty (2013); PIB (2016)

Although there are no defined international benchmarks for the number of bids per block, the US auctions for leases on the Outer Continental Shelf (OCS) are often used as a reference, as they have generated sufficient data to allow for reasonable observation. Iledare et al. (2004) show that during the period 1954–99, average numbers of bids per block in the US-OCS auctions ranged from a minimum of 2.66 to a maximum of 3.96 (Sen and Chakravarty, 2013). Figure 2 above shows that although the DSF round performed well by previous standards (namely in comparison with most of the NELP rounds, barring NELP-V and VII), at just 2.91 bids per block the figure arguably lies towards the lower end of the range, by international competitive standards. However, the positive response to the DSF round also appeared to ‘buck the trend’ of relatively low oil prices – especially as in previous bidding rounds, poor responses have tended to coincide with low oil prices, as seen in Figures 1 and 2.

Based on an approach set out in Iledare et al. (2004), Table 2 analyses participation in the DSF round in greater detail using the measure of the number of bids per block, and accounting for geological and other differences. It breaks the data down by:

- geological type: onshore and shallow-water versus deep-water,
- competitiveness: blocks that attracted multiple bids (competitive) as opposed to single bids (non-competitive), and
- bidding behaviour: bids that were submitted through joint ventures as opposed to solo ventures.

Previous NELP rounds are included in order to provide a point of comparison. The table additionally groups these attributes under the NELP regime into two separate policy periods: the first covers the period up to NELP-V⁸ while the second period (2006–10) covers the sixth to the ninth bidding rounds. This grouping is based on the premise that significant policy changes were made within the NELP from 2006 onwards (as seen in Table 1). Sen and Chakravarty (2013) contains a deeper analysis of the NELP rounds – here we focus on the DSF round.

Table 2: Competitiveness of DSF round vs. NELP rounds

		<i>Number of bids per block</i>					
		NELP (2001–5)		NELP (2006–10)		DSF (2016)	
		onshore & shallow-water	deep-water	onshore & shallow-water	deep-water	onshore & shallow-water	offshore
Competitive	Joint	1.43	1.26	1.65	0.52	0.38	0.10
	Solo	0.61	0.81	0.92	0.28	3.50	0.35
	All	2.05	2.07	2.57	0.80	3.88	0.45
Aggregate	Joint	1.52	1.33	1.87	0.84	0.38	0.10
	Solo	0.73	0.93	1.06	0.31	4.23	0.60
	All	2.25	2.26	3.01	1.15	4.62	0.70

Source: Sen and Chakravarty (2013); PIB (2016)

The last two columns of Table 2 show mixed results for the DSF round. In general, around 65 per cent of onshore blocks attracted multiple bids (more than one bidder), compared with only 15 per cent of offshore blocks. There has been an overall deterioration in the competitiveness of bidding for deep-water blocks since the NELP rounds, with the number of bids per block ranging very low, from 0.10 to 0.70; further, only eight out of 20 offshore blocks (contract areas) received bids. This is significant as offshore areas are deemed as having greater potential than onshore areas in India (Sen, 2016); further, offshore areas represent a higher proportion of the ‘Nomination Regime’ acreage of NOCs, from which the fields for the DSF round have been carved out.

⁸ Data for the first and second bidding rounds was unavailable; however, this inadvertently equalizes the length of each policy period (4 years).

Table 3: Details of companies awarded contracts under DSF round

Company Name	Ownership	Contract Area(s)	Type of Entrant	Bid(s) Submitted
Prize Petroleum	Public Indian	– Onland	Previous experience	Joint & Solo
Indian Oil Corporation Ltd	Public Indian	– Onland & Offshore	Previous experience	Solo
Bharat Petro Resources	Public Indian	– Onland & Offshore	Previous experience	Solo
Oil India Limited	Public Indian	– Onland	Previous experience	Joint
Hindustan Oil Exploration Company Ltd	Private Indian	– Onland & Offshore	Previous experience	Joint
OilMax Energy Private Ltd	Private Indian	– Onland	Previous experience	Solo
Adani Welspun Exploration Ltd	Private Indian	– Offshore	Previous experience	Solo
Megha Engineering & Infrastructures	Private Indian	– Onland	New entrant	Solo
Vijayasri Bhaskar Industries Private Ltd	Private Indian	– Onland	New entrant	Solo
Ramaynalspat Private Ltd	Private Indian	– Onland	New entrant	Joint
BDN Enterprises Private Ltd	Private Indian	– Onland	New entrant	Joint
Duggar Fiber Private Ltd	Private Indian	– Onland	New entrant	Joint
Mahendra Infrestrech Private Ltd	Private Indian	– Onland	New entrant	Joint
PFH Oil and Gas Private Ltd	Private Indian	– Onland	New entrant	Solo
Nippon Power Limited	Private Indian	– Onland	New entrant	Solo
GEM Laboratories Private Limited	Private Indian	– Onland	New entrant	Solo
KEI-RSOS Petroleum and Energy Private Ltd	Private Indian	– Onland & Offshore	New entrant	Solo
Sun Petrochemicals Private Ltd	Private Indian	– Offshore	New entrant	Solo
Adbhoot Estates Private Ltd	Private Indian	– Offshore	New entrant	Joint
Enquest Drilling Private Ltd	Private Indian	– Offshore	New entrant	Joint
SKN Haryana City Gas Distribution Limited	Private Indian	– Offshore	New entrant	Joint
South Asia Consultancy	Foreign	Onland	New entrant	Solo

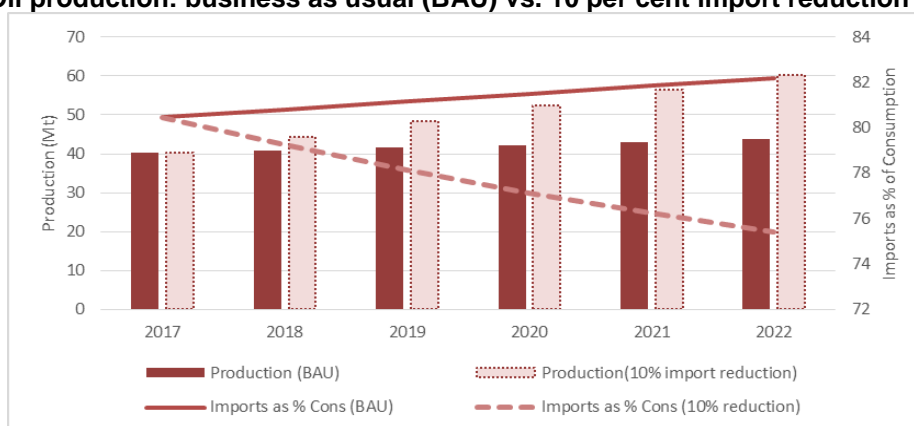
Source: PIB (2017a;b)

On the other hand, the aggregate number of bids per block for onshore areas was much higher than for all previous NELP rounds, but there was also a deterioration in joint bids (in other words, joint ventures) for competitive blocks (those blocks attracting multiple bids) reflecting greater competitiveness of the round. Joint venturing allows the pooling of resources to meet the minimum capital requirements for bidding, and also allows risk-sharing between firms (Iledare et al., 2004, 246). The low prevalence of joint venturing is especially significant, as out of the 22 companies awarded contracts, 15 (mainly small Indian private sector companies – see Table 3) are new entrants to the oil and gas exploration and production sector (PIB, 2017a;b). These companies represent the agro-chemical, petrochemical, infrastructure, oil service, and lubricant industries (among others). This potential lack of experience brings into question whether these companies will be able to deliver on the objectives of the DSF round.

2.2 What were the objectives of the DSF round?

The DSF round has been explicitly linked to a wider energy policy goal: that of reducing India’s ‘energy import dependency’ by 10 per cent by the year 2022. The round was therefore launched to ‘early-monetize the already discovered hydrocarbon fields’ (PIB, 2017a;b). Assuming that ‘energy’ is taken primarily to mean oil (which represents the overwhelming proportion of the country’s energy imports) India’s oil consumption, which grew at an average annual rate of 4.8 per cent per annum between 2005 and 2015, stood at 4.8 million barrels/day (mb/d), or 212 Million tonnes (Mt), in 2016, with 81 per cent of this sourced from imports (BP, 2016). Production, on the other hand, stood at 856 thousand b/d (40.2 Mt) in 2016, and has been growing at the much slower average annual rate of 1.7 per cent over the period 2005–15 (BP, 2016). A 10 per cent reduction in imports by 2022 from current (2016) levels would entail increased production of around 363 thousand b/d (17.2 Mt) by 2022, a rise of about 42 per cent from current levels. However, given the likely concurrent growth in oil demand to 2022 (forecast by the IEA’s New Policies Scenario to reach just over 240 Mt),⁹ a 10 per cent reduction in imports could equate to a higher requirement of 20.2 Mt (over 400 thousand b/d) of incremental production by 2022 (around 50 per cent higher over current levels), which still results in an oil import dependency of around 74 per cent of consumption. Figure 3 below depicts an illustration of the potential increase in oil production (measured on the left axis) needed to reduce import dependency (measured on the right axis) by 2022.¹⁰ Therefore, while the 10 per cent target will be difficult to achieve given rising demand and economic growth,¹¹ there is undoubtedly scope to scale up production, with an associated positive fiscal impact.

Figure 3: Oil production: business as usual (BAU) vs. 10 per cent import reduction by 2022



Source: BP (2016); IEA (2016); Author’s estimates

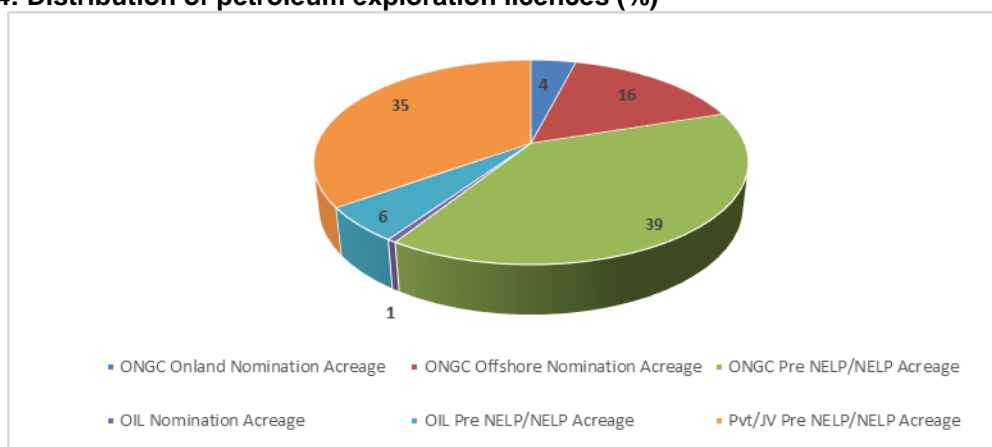
⁹ See IEA (2016). The New Policies Scenario takes into account current trends in oil demand growth as well as policy measures announced by the government related to oil in the energy mix.

¹⁰ This is based on simple linear projections and does not take into account the likely exponential growth in demand as per capita incomes continue to increase in India, or the price elasticity of oil demand.

¹¹ Also see Platts (2017).

The estimated cumulative peak production of oil from fields awarded under the DSF round is 15 thousand b/d (PIB, 2017a;b),¹² or around 4 per cent of the incremental production required to achieve the oil import reduction target. Although this represents a fraction of what is needed in total, given that the fields contain proven discoveries it presents a near-certain opportunity, if successfully developed, to boost domestic production in the short term (albeit marginally), underscoring the criticality of production enhancement. Future DSF rounds are likely to be based on undeveloped small and marginal fields held by NOCs as part of their ‘legacy’ assets under the Nomination Regime. Recoverable reserves under the Nomination Regime acreage are estimated at roughly 1,402 Mt of oil and oil equivalent gas, or 67 per cent of total recoverable reserves (DGH, 2015, 91). This presents substantial potential for ramping up domestic production. NOCs hold 65 per cent of India’s total licensed acreage while Nomination Regime acreage, which arguably included the most prospective areas that were first favourably allocated to NOCs from the 1970s onwards, formed just over 20 per cent of total licensed acreage in 2014, as seen in Figure 4 below. Yet, as Sen (2016, 9) argues, production from India’s NOCs has plateaued since the mid-2000s, while capital expenditure by ONGC, for whom Nomination Regime acreage forms 34 per cent of its portfolio, has fallen by roughly 25 per cent since 2010. Lower than expected performance by the NOCs suggests the likelihood of more – hitherto undeveloped – areas containing proven discoveries being targeted for production enhancement under future DSF rounds, and offshore blocks are likely to feature increasingly.

Figure 4: Distribution of petroleum exploration licences (%)



Source: Sen (2016); data from DGH (2014)

A second objective of the DSF round is to generate revenues for the exchequer, and although government revenues from royalty and revenue-sharing from production for the DSF round have been estimated on a notional basis at ₹143bn (US\$2.2bn) (PIB, 2017a;b), in reality these will be entirely contingent upon companies achieving the production targets proposed in their winning bids, and in turn upon the incentives to do so.

3. Potential (dis)incentives to production under the DSF regime

Once the winning bidders are announced, companies are required to approach NOCs for the transfer of petroleum mining or exploration leases; they are required to make a one-time payment to the NOCs representing the book value of wells and facilities, which are then transferred to them (Mahurkar, 2017). The winning companies are then expected to undertake the drilling of wells (appraisal and development) committed in their bids and to commence commercial production within three, four, and six years, respectively, for onshore, shallow offshore, and deep-water offshore areas;

¹² Also 2 million standard cubic metres/day of gas. The DSF fields are estimated to contain between 62 and 82 million metric tonnes of oil and oil equivalent gas over the economic lives of the fields (PIB, 2017a;b; Hindu Businessline, 2016).

failing this, the contract areas will stand relinquished (Mahurkar, 2017). The immediate problem that this throws up is that if companies fail to deliver on commercial production, this could lead to a 'recycling' of acreage in future DSF rounds, prolonging the time taken to develop discoveries and delaying India's import reduction target. Effectively, this implies the risk of the DSF round simply resulting in transfers of productive assets away from NOCs and serving as a valuable short-term portfolio addition (particularly for new entrants), rather than in a medium to longer-term producing asset that will contribute towards the import reduction target. In this regard, there are three areas of the DSF regime which require specific attention.

3.1 Low barriers to entry

The small size of the fields on offer under the DSF round (32 per cent were less than 10 square km and 47 per cent less than 20 square km)¹³ potentially precluded significant interest in the round from big international majors. In this regard, the round was aimed at attracting smaller players, and thus entry barriers were set quite low, with no prior technical experience in oil and gas exploration and production needed for companies to participate in the bidding, no signature bonuses or upfront payments (apart from a tender fee of US\$1,000 for participating in the round, and payment of the book value of assets and facilities to the NOCs upon the award of the contract area), and no minimum mandatory work programme. The liquidated damages for unfinished work programmes are: US\$1mn, US\$3mn, and US\$6mn for each onshore, shallow-water, and offshore development or appraisal well committed in the winning bid. Notably, these amounts for liquidated damages are exactly the same as those introduced under NELP-VIII (Sen and Chakravarty, 2013, 35), which failed to deter 'speculative bidding' or to produce any sort of revival in upstream activity. More generally, the literature on auctions suggests that if penalties are not set at a significantly high level, bidders may simply adjust their bids to include these costs; thus if the costs of defaulting on commitments are small, bidders end up bidding (and paying for) 'options on prizes rather than the prizes themselves' (Klemperer, 2004). This would hold true for the amounts of liquidated damages per well, which form a fraction of the total cost of drilling a well and would be unlikely to offset the foregone expected gross revenues (amounting in total to around US\$7bn)¹⁴ from the failure to achieve commercial production.

Comparisons have been drawn between the DSF round and India's 1993 discovered fields round under which 28 contracts were signed, out of which 25 contract areas continue to be operational today (Addison, 2016), including the Panna, Mukta, and Ravva fields which have turned out to be among India's most prolific producing fields. However, entry barriers in the 1993 round were set higher (with signature bonuses and statutory levies that included the oil cess and customs duty), and this attracted specialist exploration and production companies as bidders. Perhaps a more accurate comparison is with the 'S' type blocks (smaller, onshore blocks around 200 square km in area) introduced from the seventh round of NELP, which offered up marginal fields that did not meet the economic thresholds set by larger companies, and for which entry barriers were set very low (with no technical criteria, and basic financial qualifications). The aim of this was to encourage participation from small and medium-sized companies. Sen (2013) argues that this in fact encouraged unrealistic bids from smaller, non-specialist companies.

Table 4 below contains a summary of 'S' type blocks from NELP rounds VII and VIII,¹⁵ along with the current status of the block. The table shows that although the exploration period (seven or eight years) under these NELP rounds has lapsed, only four discoveries have been made. The majority of 'S' type blocks under NELP-VII have been relinquished, or are proposed for relinquishment, whereas there have been delays in the monetization of the blocks awarded under NELP-VIII. We were unable to identify any producing fields among the 'S' type blocks. It should also be noted that while the 'S' type blocks under NELP-VII and VIII attracted a mix of NOCs, oil sector players, and new entrants,

¹³ Mahurkar (2017).

¹⁴ Or ₹465bn (PIB, 2017a;b).

¹⁵ Data for NELP-IX was not available. It should be noted that the data in Table 4 is meant to be strictly illustrative and not definitive as it is subject to verification.

NELP-IX (for which data was unavailable) attracted mostly small companies (and new entrants). The table also illustrates the aggressive nature of bids in terms of companies' biddable cost recovery, and the profit shares offered to the government at the two different slabs of the investment multiple (we return to this in the next sub-section).

It can be argued that while the DSF round was designed to minimize the administrative hurdles and onerous monitoring of operations and costs that have typically plagued previous upstream activity in India,¹⁶ the low entry barriers, combined with low penalties, are insufficient to incentivize companies to increase production, which is especially critical early on to achieve the highest tranche of production (and the highest revenue-sharing point). This has the potential to result in a high turnover of undeveloped acreage.

¹⁶ See CAG (2011).



Table 4: Details and current status of 'S' type blocks awarded under NELP VII and VIII

NELP Round	'S' Type Blocks	Area (sq.km)	C/R (%)	P/S 1.5 and below (%)	P/S 3.5 and above (%)	MWP (US\$ mn)	Current Status	Discoveries
VII	CB-ONN-2005/10	270	20.0	88.0	89.0	14.8	Operational	0
VII	CB-ONN-2005/11	257	30.0	79.0	80.0	20.4	Relinquished/Proposed for relinquishment	0
VII	PR-ONN-2005/1	1807	47.0	60.0	75.0	7.9	Relinquished/Proposed for relinquishment	0
VII	CB-ONN-2005/1	61	0.0	72.0	73.0	N/A	Relinquished/Proposed for relinquishment	0
VII	CB-ONN-2005/2	81	8.0	81.0	85.0	11.0	Relinquished/Proposed for relinquishment	0
VII	CB-ONN-2005/3	48	18.0	72.0	73.0	12.9	Operational	0
VII	CB-ONN-2005/4	31	15.0	88.0	89.0	6.9	Relinquished/Proposed for relinquishment	1
VII	CB-ONN-2005/5	83	10.0	65.0	75.0	7.9	Operational	0
VII	CB-ONN-2005/6	102	10.0	65.0	75.0	7.2	Relinquished/Proposed for relinquishment	0
VII	CB-ONN-2005/7	199	7.0	81.0	86.0	70.4	Relinquished/Proposed for relinquishment	0
VII	CB-ONN-2005/8	133	80.0	65.0	80.0	5.8	Relinquished/Proposed for relinquishment	0
VII	CB-ONN-2005/9	170	18.0	71.0	72.0	21.4	Operational	2
VIII	AA-ONN-2009/3	84	28.1	40.0	80.0	28.1	Relinquished/Proposed for relinquishment	0
VIII	AA-ONN-2009/4	84	43.8	70.0	85.0	43.8	Operational	0
VIII	CB-ONN-2009/1	113	25.2	75.0	85.0	25.2	Operational	0
VIII	CB-ONN-2009/2	68	22.3	75.0	85.0	22.3	Operational	0
VIII	CB-ONN-2009/3	90	23.9	75.0	85.0	23.9	Operational (PEL awaited)	0
VIII	CB-ONN-2009/4	69	15.6	70.0	80.0	15.6	Operational	0
VIII	CB-ONN-2009/5	165	37.6	83.0	84.0	37.6	Operational	0
VIII	CB-ONN-2009/7	144	16.9	75.0	85.0	16.9	Operational	0
VIII	CB-ONN-2009/8	136	13.0	72.5	73.5	13.0	Operational	1

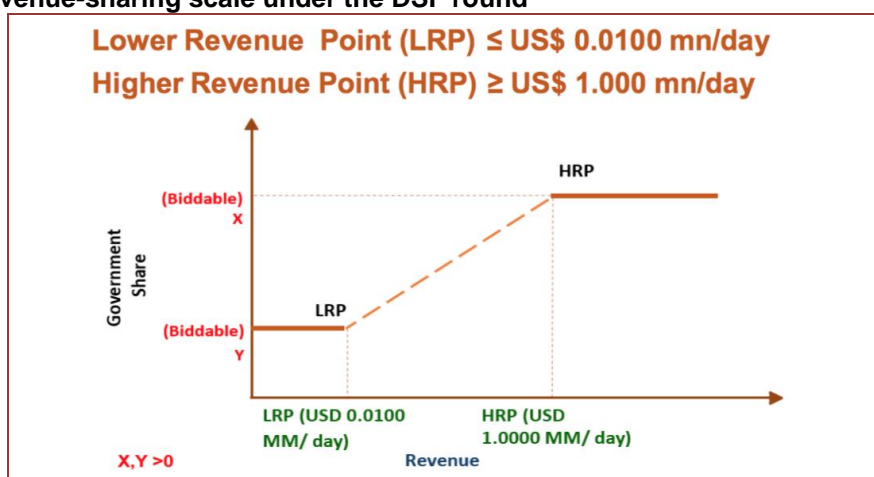
Source: DGH (2015); DGH (2017); Compiled by Author; Note: C/R – cost recovery; P/S – profit share; MWP – Minimum Work Programme; Data subject to verification

3.2 Do high bids translate into high production? (prospects for ‘gaming’ the system)

India has long struggled with designing a fiscal system which is easy to administer, yet minimizes room for ‘gaming’ by potential bidders. This was exemplified by the pre-tax investment multiple (PTIM) – the ratio of cumulative cash flow to cumulative expenditures – for the first five rounds of NELP. The PTIM comprised six ‘slabs’ and bidders had to propose what percentage of profits they would share with the government at each predefined slab. This perversely incentivized the winning companies to bid high profit-share percentages at higher slabs, and then frontload or inflate capital expenditures to ensure that the PTIM did not ‘move up’ into higher slabs (Sen and Chakravarty, 2013). Combined with low entry barriers and low penalties for underperformance, this inadvertently curtailed both production and potential revenues to the government. The ‘sliding scale’ PTIM that was brought in for NELP rounds VI–IX was meant to ensure a share of profits to the government at every scale of the ratio, in order to address the problem. However, this did not entirely resolve the issue of blocks not reaching their full production potential, as in the absence of specific incentives to produce, there was still an incentive to stay at the lower range of the PTIM.

Sen and Chakravarty (2013) also discusses the pervasive problem of ‘speculative bidding’ in Indian oil and gas lease auctions. Table 4 above, for instance, shows that aggressive bids were put in, often by smaller companies, to win contracts for the small (‘S’ type) fields – such as zero per cent cost recovery and extremely high percentages of profits at both the lower and higher ends of the PTIM scale (sometimes in excess of 80 per cent even for the lower end of 1.5 and below). Inadvertently, this defeated the purpose of the sliding scale, which was meant to allow companies to gradually scale up investment and production, allowing the government to progressively share in the upside. As Table 4 shows, some of the most aggressive bids for small fields under the NELP rounds have, in fact, yielded no production or discoveries, with fields eventually being relinquished. Relinquishment and the ‘recycling’ of fields then affects perceptions of their prospectivity amongst bidders in future rounds, compounding the cycle of upstream decline.

Figure 5: Revenue-sharing scale under the DSF round



Source: DGH (2016)

The revenue-sharing mechanism, although it removes the administrative and regulatory burden of monitoring costs, is arguably susceptible to the same weaknesses – which remove the incentives for a company to move up higher through the ‘revenue-sharing’ scale. Evaluations of the DSF bids were based on two parameters:

- a fiscal parameter (the Net Present Value of government revenues yielded through the percentage revenue shares bid by the company at the lower and higher revenue points) which had a weighting of 80 points, and
- a work programme parameter (the number of development and/or appraisal wells committed to be drilled by the company) which had a lower weighting of 20 points.

Under the fiscal parameter, companies were required to bid the percentage of revenues that they would share with the government at a predefined 'lower revenue point' of US\$0.01mn/day and at a 'higher revenue point' of US\$1mn/day. The lower revenue point of US\$0.01mn/day equates to US\$3.65mn/year and (at an oil price of \$50/bbl) to a production of around 200 b/d. The higher revenue point similarly equates to US\$365mn/year and (at US\$50/bbl) to a production of 20 thousand b/d. As seen from Figure 5, the share of revenue to the government between the lower and higher points is worked out on a linear scale, to ensure that a continuous share of average daily revenues from production accrues to the government.¹⁷

There is a clear disconnect between the fiscal and work programme criteria – while companies could accordingly bid revenue shares which yield a relatively high Net Present Value of government revenues (as the fiscal criterion is given a higher weighting in the overall bid evaluation), there is no clear incentive (apart from the liquidated damages and the relinquishment requirement) for companies to scale up production to the higher revenue point. Revenues to the government are thus entirely dependent on movements in the oil price, and production could potentially be no higher than 200 barrels oil/day. The only way to offset this outcome is to have a level of competition in the auction rounds which ensures that winning companies are committed to the scaling up of production; alternatively, strong disincentives aimed at discouraging 'speculative' bidders, or those who are not fully aligned with the ultimate government goal of the DSF round (the scaling up of production) should be instituted. Otherwise, the fiscal criteria should be linked more explicitly with production enhancement.

3.3 Evaluation of resource revenues based on notional field profiles

A brief mention must be made of a third and final area which requires attention: bidder evaluations (as well as government evaluations) are made entirely on notional field production profiles and revenue streams, typically containing assumptions on 'low', 'likely', and 'high' cases. Past experience has shown that this exercise can sometimes contribute to unexpected outcomes.¹⁸ While upstream activity inherently contains elements of risk, past experience leads to calls for a dynamic process which allows for the continuous updating of field profiles in the early stages of exploration and/or production. The HELP regime allows for three-year 'reconnaissance contracts' that are separate from the longer exploration contracts; this gives companies a period of time to survey prospective areas prior to putting in a long-term commitment, and also the ability to augment India's national data repository. An element of this exercise in data updating could be injected into future DSF rounds, perhaps on a short-term basis (a period of months rather than years) which could allow for a more realistic calculation of revenue flows to companies and government.

¹⁷ See KPMG (2016).

¹⁸ A broad example is that of the 'KG-D6' field, where the discovery initially estimated at 11 Tcf was eventually revised downwards to 3–5 Tcf. Although the reasons for the decline have been much-debated (see Jain, 2012), the potential downside was not visible in the notional field profiles.

4. Policy options for consideration in future DSF rounds

At a speech to launch the DSF round in Mumbai on 6 June 2016, India's Oil Minister stated:

'I would like to emphasize that this is probably the last time that the discovered small fields are being offered under a liberal regime – without any signature bonus and mandatory work program for exploration and development' (MOPNG, 2016).

This strongly signals that the first DSF round was possibly meant to test the response to India's auction rounds under a new administration and a new fiscal regime, after a six-year hiatus and in a low oil price environment. Future rounds will likely see a tightening-up of criteria. If so, a future bidding round for discovered yet undeveloped/discovered small fields would need to seriously consider the following qualifications:

- It needs to be explicitly linked with a **clear objective** (such as a medium-term production target);
- It needs to **attract the necessary expertise** to meet the objective;
- It needs to be **simple to administer** and monitor, given India's regulatory capacity;
- It needs to be **scalable** (in other words, the focus should be on incentivizing early investment and production and on thereafter quickly achieving scale); and,
- It needs to **minimize the number of fiscal parameters** that leave the regime open to 'gaming' (it should automatically disincentivize 'speculative bidding').

A thorough investigation of the different options is beyond the scope of this Comment,¹⁹ but an initial overview of these, drawing from international experience, is provided below:

- A raising of entry barriers for the DSF rounds – options include signature bonuses and a minimum work programme expenditure commitment;
- Raising the disincentives to 'game' the system by placing greater liability on the company in the case of failure to carry out commitments, for instance through adequate upfront performance guarantees, which could include a bid bond, letter of credit, parent company guarantee, or trust to guarantee abandonment obligations (as in the case of Mexico);
- The establishment of a baseline level of production, with a required fixed percentage (say 10 per cent) increase over the baseline, after which a payment (per barrel, for example) can be made to the contractor only on incremental production, as an incentive to ramp up production early on (such as in the Risk Service Agreements in Iraq);
- A clearly defined plateau production level with additional fiscal incentives for the contractor to achieve plateau production faster within the stipulated timeframe;
- A limit on the higher revenue point, set as some multiple of the lower revenue point;
- Some variation of a single revenue share (or single revenue point), or of a constant revenue share for the first five years, instead of the lower and higher revenue points, to ensure that the focus is on the scaling up of production.

Some combination of the above options could serve to fill in the gaps within the DSF regime, prevent 'gaming' of the fiscal system or 'speculative bidding', reduce the susceptibility of the revenue-sharing regime to the same weaknesses which characterized the NELP regime, and help to ensure that the DSF rounds deliver their promised production potential in the next five years.

¹⁹ This is the subject of a forthcoming paper.

References

- Addison, V. (2016) 'India looks to lure oil, gas investors in latest bid round', *E&P*, 15 July. [Available at www.epmag.com/india-looks-lure-oil-gas-investors-latest-bid-round-1019426]
- BP (2016) *Statistical Review of World Energy*. [Available at www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html]
- CAG (2011) 'Performance Audit of Hydrocarbon Production Sharing Contracts', Ministry of Petroleum and Natural Gas, Comptroller and Auditor General of India, Report No. 19 of 2011 for the period ended March 2011. [Available at www.cag.gov.in/content/report-no-19-2011-%E2%80%93-performance-audit-hydrocarbon-production-sharing-contracts-union]
- DGH (2017) Data/Statistics on PSC Blocks, Directorate General of Hydrocarbons, Government of India. [Available at http://dghindia.gov.in/index.php/static_page?pagelId=PSC%20Blocks]
- DGH (2016) Presentation on Discovered Small Field Bid Round 2016, Dubai, 23 August, Directorate General of Hydrocarbons, Government of India.
- DGH (2015) 'Reserves Status During the Year 2015–16', in *India's Hydrocarbon Outlook: 2015-16: A Report on E&P Activities*. Directorate General of Hydrocarbons, Government of India. [Available at <http://dghindia.gov.in/assets/downloads/ar/2015-16.pdf>]
- DGH (2014) 'Petroleum Exploration and Production Activity Report', Directorate General of Hydrocarbons, Government of India. [Available at <http://dghindia.gov.in/index.php/page?pagelId=75&name=DOWNLOADS>]
- Hindu Businessline (2016) 'Discovered small fields provide good entry point for many non-oil companies', 1 December. [Available at www.thehindubusinessline.com/economy/discovered-small-filelds/article9405026.ece]
- IEA (2016) *World Energy Outlook*, International Energy Agency, Paris.
- Iledare, O.O., Pulsipher, A.G., Olatubi, W.O., and Mesyanzhinov, D.V. (2004) 'An empirical analysis of the determinants of high bonus bids for petroleum leases in the US outer continental shelf', *Energy Economics*, 26(2): 239–59.
- Jain, A.K. (2012) *Natural Gas in India: Liberalisation and Policy*, Oxford University Press.
- Klemperer, P. (2004) *Auctions: Theory and Practice*, The Toulouse Lectures in Economics, Princeton University Press.
- KPMG (2016) Roundtable Discussion on Discovered Small Fields Bid Round – Slide Deck, Dubai, August.
- Mahurkar, D. (2017) 'Making small, big...', *Forbes India*, 9 February. [Available at www.forbesindia.com/blog/business-strategy/making-small-big/]
- MOPNG (2016) Transcript of Speech by India's Minister for Petroleum and Natural Gas at Launch of Discovered Small Fields Bid Round, Hotel Taj Land's End, Mumbai, 6 June.
- NIO (2017) 'Notice Inviting Offers for HELP/RC', Directorate General of Hydrocarbons, Government of India.
- Offshore Energy (2017) 'India awards eight offshore blocks under 2016 bid round', 16 February. [Available at www.offshoreenergytoday.com/india-awards-eight-offshore-blocks-under-2016-bid-round/]
- Platts (2017) 'Platts: India Will Not Achieve Target To Cut Oil Imports By 10%', 21 April. [Available at <http://oilprice.com/Latest-Energy-News/World-News/Platts-India-Will-Not-Achieve-Target-To-Cut-Oil-Imports-By-10.html>]

PIB (2017a) 'Government of India signs Contracts awarded under Discovered Small Field Bid Round 2016', Press Information Bureau, Government of India, 27 March. [Available at <http://pib.nic.in/newsite/PrintRelease.aspx?relid=159971>]

PIB (2017b) 'CCEA Approves Award of 31 Contract Areas under DSF 2016', Press Information Bureau, Government of India, 15 February. [Available at <http://pib.nic.in/newsite/PrintRelease.aspx?relid=158497>]

PIB (2016) '42 companies submits 134 e-Bids under Discovered Small Fields Bid Round 2016', Press Information Bureau, Government of India, 21 November. [Available at <http://pib.nic.in/newsite/PrintRelease.aspx?relid=154006>]

Sen, A. (2016) 'India's Upstream Revival: HELP or Hurdle?', Oxford Energy Comment, November. [Available at <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2016/11/Indias-Upstream-Revival-HELP-or-Hurdle.pdf>]

Sen, A. and Chakravarty, C. (2013) 'Auctions for Oil and Gas Exploration Leases in India: An Empirical Analysis', OIES Paper SP30 [Available at <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2013/12/SP-30.pdf>]