

POLICY FRAMEWORK TO PROMOTE AND INCENTIVIZE ENHANCED RECOVERY METHODS

Dated: _____

Policy provides a framework to promote and incentivize Enhanced Recovery methods in the Indian Oil & Gas Industry. The policy shall apply to all private and public sector entities and their subsidiaries operating in the oil & gas industry and will come into force with immediate effect. It may be noted that all existing contracts under PSC / RSC / DSF / OALP / Petroleum Mining Lease (PML) and extension of contracts shall continue to be governed by their respective PSC / RSC / DSF / OALP/ PML agreement. This policy shall not supersede the contract agreement.

The salient features of the policy are as follows:

1. Preamble

- 1.1 Energy plays a significant role in increasing standards of living; growth in overall energy demand over the last three decades has outpaced the hydrocarbon production in India. As a result, import dependence has increased significantly and nearly 80% of the oil and gas consumption is currently met through imports.
- 1.2 Average recovery factor from the oil and gas fields in India has remained below the global average and most of the major producing fields in India are ageing.
- 1.3 As a part of the wider 'Energy Security' program, the Government has set a goal to reduce 10% of crude oil imports by 2022. 'Enhanced Oil Recovery' (EOR)/ Enhanced Gas Recovery (EGR) / Unconventional hydrocarbon production techniques have been envisaged as potential solution to increase domestic production
- 1.4 Enhanced Oil Recovery' (EOR)/ Enhanced Gas Recovery (EGR) / hydrocarbon production from unconventional methods have not been adopted widely, under the applicable fiscal regimes and the prevailing crude oil/ gas prices,owing to the following constraints:
 - 1.4.1. Enhanced Recovery (ER) / unconventional hydrocarbon production methods are capital intensive and complex from a technology standpoint. This makes production from such measures commercially challenging in many cases
 - 1.4.2. Applicability of the right technology for a particular field requires extensive laboratory and field studies
 - 1.4.3. ER also requires considerable supporting infrastructure, availability of resources and a conducive ecosystem. The ecosystem is still not very well developed in the Indian context

- 1.5 Therefore, in order to encourage entities in the exploration and production activities to evaluate and consider ER techniques / unconventional hydrocarbon production methods, an incentive framework policy has been developed, backed by economic considerations and inputs from various stakeholders

2. Objectives of the Policy

- 2.1 The overarching objective of the policy is to encourage more players to explore possible ER techniques / unconventional hydrocarbon production methods, in order to improve productivity of existing fields and thereby enhance the overall production of hydrocarbons in India, and
- 2.2 To have a transparent, non-selective, non-discriminatory criteria for applicability of these incentives for undertaking such initiatives, and
- 2.3 To develop an enabling ecosystem that will help to create research facilities, foster greater industry-academia collaboration and develop a platform for knowledge sharing and exchange of ideas.

3. Definitions

- 3.1 **Enhanced Oil Recovery (EOR)** process typically involves injection of fluids which then interact with the reservoir rock-fluids system resulting in alteration in fluid properties in situ and fluid rock interactions. Alterations in fluid properties in situ can result in oil swelling, viscosity reduction, composition and phase behavior changes. Fluid rock interactions include interfacial and surface tension reduction, rock wettability modification and reduction in capillary pressure.
- 3.2 **Enhanced Gas Recovery (EGR)** process involves injection of fluids which then interact with the reservoir rock-fluids system resulting in alteration in fluid properties in situ and fluid rock interactions. EGR typically refers to injection of Nitrogen, CO₂ or other inert gases into natural gas reservoirs to artificially increase pressure/mobility or deploy de-watering techniques (equipment / chemicals) resulting in increase in yield from gas reservoirs
- 3.3 **Enhanced Recovery (ER)** refers to EOR and/or EGR. List of ER technologies as per the definition above in 3.1 and 3.2 has been given in Annexure I. It will also include any efforts made to increase production of oil and gas beyond 50% of current recovery for oil fields and beyond 75% for gas fields, as defined in section 3.5.
- 3.4 **Unconventional hydrocarbon production methods** include following:
 - 3.4.1. Shale oil / shale gas production
 - 3.4.2. Tight oil production (less than 1md) / tight gas production (less than 0.1 md)
 - 3.4.3. Production from Oil shale
 - 3.4.4. Production from gas hydrates

- 3.5 **Current Recovery**– for Oil for a field is defined as the ratio of cumulative production of Oil at the end of last fiscal period to ‘in-place volumes’ and Current Recovery for gas field is defined as the ratio of the cumulative production of gas at the end of last fiscal period to ‘in-place volumes’. For the exclusive purposes of this policy, the ‘in-place volumes’ would be the 3P numbers of the discovery/field, duly audited by renowned third party reserve certifying agencies.
- 3.6 **Screening Analysis / Screening**– involves gathering of reservoir data and carrying out laboratory and simulation studies on the data to ascertain high level techno-commercial feasibility of ER processes for the given field /reservoir.
- 3.7 **ER Pilot**– involves carrying out the selected ER (based on Screening) on a small portion of the field / reservoir, which is considered representative of the field, in order to ascertain the results of the ER method and its evaluation for field scale implementation.
- 3.8 **Year** means a period of twelve (12) consecutive Months according to the Gregorian calendar.
- 3.9 **Operator/Contractor** –Operator/Contractor refers to one of the entities / party having a participating interest in a given contract area / field and is appointed as the ‘operator’ in accordance with the terms of the contract (PSC / RSC / DSF / OALP/ PML agreement). Operator is typically entrusted with carrying out day to day Petroleum Operations during the term of the Contract.
- 3.10 **Commercial Production** - The production of crude oil or condensate or natural gas or any combination of these from the Contract Area (excluding production for testing purpose) and delivery of the same at the relevant Delivery Point under a program of regular production for sale.
- 3.11 **EOR reference price** shall be USD 80 / barrel of crude oil or as notified by ER Committee
- 3.12 **Notification Date**–Date on which the policy is approved by the cabinet and comes into effect on all private and public sector entities and their subsidiaries operating in the upstream oil & gas industry
- 3.13 **Due Date** –Date on which the policy expires
- 3.14 **ER Project** is defined as a field scale implementation of an approved ER technique for a given contract area or field

4. ER Committee

- 4.1 Government shall appoint a Committee (ER Committee) comprising of officials from MoPNG/DGH/others. The committee shall be responsible to review and provide approval at different stages which include Eligibility Criteria, ER Pilot, ER Commercial phase and the ER incentives applicable for each case for ER technologies or unconventional production

processes as detailed out in the sections 5, 8, 9, 10,11 as well as other matters related to administration and governance of this policy

4.2 The ER Committee shall constitute of the following members:

4.2.1. Joint Secretary – Exploration (MoPNG)

4.2.2. Head of Reservoir (DGH)

4.2.3. ER Coordinator / Convener (DGH)

4.2.4. Sector expert from academia

4.3 The ER Committee can co-opt any additional member, if required

5. Eligibility Criteria

5.1 This policy and any incentives mentioned in this policy would be applicable across all regime types (Nomination, Pre-NELP, NELP, DSF and HELP) as well as to the fields which were/will be awarded extension under the Pre-NELP, NELP and nomination regimes. Projects would be considered ER projects if they are deemed by the ER Committee to be satisfying definition of ER as laid out in section– 3.1, 3.2, and 3.3 and also satisfies the following conditions:

5.1.1. Fields should be having a minimum three years of commercial production to be considered eligible for incentives

5.1.2. Fields which are currently producing oil or gas using ER techniques and/or fields for which FDP has been approved for ER projects before the notification date will not be considered eligible for incentives under this policy

5.1.3. Only those fields whose ER screening report is submitted to DGH within 7 years from policy notification date shall qualify for incentive benefits under this ER policy

5.2 This policy and any incentive mentioned in this policy would also be applicable to unconventional oil & gas production methods as defined in section 3.3 and 3.4.

5.3 For oil and gas production through ER techniques (mentioned in Section 5.1), the operator needs to undertake screening and pilot studies as per the procedure mentioned in Section 7, Section 8 and Section 9. For unconventional oil & gas production methods mentioned in Section 5.2, the operator should follow the regular procedure as per the contractual norms for filing of FDP and apply for incentives at the time of FDP submission, refer section 10.

5.4 Operator has the flexibility to change the ER technology after approval of a project by the ER committee provided that screening studies have been carried out for the technology and that the technology is included in the approved technology list (Annexure I). The operator shall submit a revised ER project plan for ER Committee's approval. However, overall incentive period shall still remain ten [10] years in such cases.

6. Operative Period

- 6.1 This policy will come into effect from the notification date and shall remain in effect for Ten (10) Years (Due Date) from the notification date
- 6.1.1. ER Committee may carry out a mid-term review, at the end of five years, on the overall efficacy of the policy and assess performance of ER technologies applied on approved fields, incremental production profile as a result of ER activities etc.
- 6.2 ER projects or unconventional hydrocarbon production processes approved by the ER Committee during this period shall be eligible for incentive as outlined in section 11
- 6.3 In case the Government decides to discontinue the policy before the Due Date, all approved ER projects/unconventional production process will continue to get the applicable incentives for the time period outlined in section 11 or as decided by the Government

7. ER Screening

- 7.1 ER Screening would be mandatory for all the fields which have been in commercial production for more than 3 years as on date of notification of this policy. The operator may undertake ER screening through institutions such as IRS (ONGC), IIT-ISM Dhanbad, IIT Kharagpur, IIT Bombay, IIT Delhi and PDPJ. The list of institutes to carry out screening process shall be reviewed by ER Committee every year or as deemed necessary and new institutions may be added to the list based on recommendation from DGH.
- 7.2 Alternatively, operators may engage any of the renowned overseas institution to assist in carrying out screening studies, provided they have collaboration with any of the Indian institutions listed above in section 7.1 or have an India establishment (and approved by ER committee).
- 7.3 For producing fields which have been in commercial production for more than 3 years as on date of notification of this policy, the Contractor will submit to the DGH, an ER screening report within 12 months of notification date (Clause 7.1). Producing fields which have not completed 3 years of commercial production as on the policy notification date will be required to submit the ER screening report within 12 months of completing 3 years commercial production. The screening report should necessarily cover the following details:
- 7.3.1. Production volumes historical and forecasted for Base case (without ER)
- 7.3.2. High level Techno-economic feasibility of the selected ER method, if any
- 7.3.3. Production volume estimates / forecast after ER, if applicable
- 7.3.4. Additional specific details as required by DGH

- 7.4 Result of a screening study may be considered favourable by the DGH, if it establishes the applicability of an ER technique to the reservoir / field which would result in an enhanced production
- 7.5 It would be mandatory for the operator to pursue ER pilot if the DGH considers the result of ER screening report as favourable or directs the operator to conduct the ER pilot, if there exists reasonable probability of enhanced recovery.

8. ER Pilot

- 8.1 **ER Pilot** should be initiated within 12 months from the date of filing the screening results with the ER Committee provided the Screening results are deemed favourable. ER Committee will approve the ER Pilot on the basis of an MC (Management committee) approved 'work program' or equivalent (depending on the licensing regime).
- 8.2 Results of the Pilot stage should be submitted to ER Committee within 3 years from the Pilot initiation date. The contractor is expected to undertake the pilot at the earliest.

9. ER Commercial phase

- 9.1 **ER Production Approval:** The contractor should submit an application within 12 months of the pilot report submission, along with all relevant details of the ER project, for availing the incentives, to the ER Committee for approval (Refer clause 4).
- 9.2 The application for ER incentive shall be approved by the ER Committee only if the proposed project satisfies the eligibility criteria as per sections 5.1 and 5.2, and
- 9.3 The field/ Contract area should not be under any arbitration or under court proceedings, and
- 9.4 Details of the project submitted by the operator after examination is found to be satisfactory.
- 9.5 The details of the project must necessarily contain all the information or details pertaining to the ER project mentioned below in clauses 9.5.1 to 9.5.5 and any additional information / details as required by the Committee
 - 9.5.1. Details of the reservoir / field location and size in which ER project is applicable including well details
 - 9.5.2. Production volume historical
 - 9.5.3. Production volume estimates and forecast with ER from the designated ER wells
 - 9.5.4. Planned capex for ER project and milestone timelines including number of wells to be drilled
 - 9.5.5. Technical details of the ER scheme selected

- 9.5.6. Due diligence from a renowned third party service provider (who is pre-approved by DGH based on operator's request)
- 9.6 The ER Committee will approve the field as eligible for ER incentives based on conditions as provided above within 60 days of application/ last reply of contractor, provided the queries raised by the Committee have been satisfactorily replied to by the Contractor.
- 9.7 The ER Committee may seek opinion of a renowned third party, if required, for the same.
- 9.8 The proposals under enhanced recoveries beyond 50% for oil and 75% of gas, as mentioned in section 3.3, will need to be submitted for review and approval of the ER committee as Field Development Plans (FDP).

10. Unconventional Hydrocarbon Production methods

- 10.1 The incentives outlined in section 11 will be applicable to future discovery of shale gas and or shale oil / tight oil and/or tight gas / gas hydrate as well as existing discoveries of unconventional resources which are yet to commence production.
- 10.2 Fields having at least $2/3^{\text{rd}}$ of the total number of wells completed as producers in the shale gas and/or shale oil// tight oil and/or tight gas / gas hydrate reservoir area shall be considered as eligible for incentive mentioned in section 11 for the entire output from such fields. While considering the number of wells, the number of wells will be rounded off to the lower number in case of decimal.
- 10.3 Mini fracking, acid fracking, frack stimulation near the well bore and frack packing or any fracking meant for well completion shall not be considered eligible for incentives under this policy.
- 10.4 The proposal for production from oil shale will be submitted for review and approval of the ER committee as Field Development Plan (FDP) / Project.

11. Incentives for ER and other unconventional production processes

- 11.1 **ER Pilot Incentive:** Operators undertaking ER Pilot shall be eligible for weighted deduction available from the business income to the extent of 150 per cent of any sum paid towards the ER pilot expenses. The weighted deduction will be applicable till 31 March, 2025.
- 11.2 Contractors undertaking ER pilot are eligible to apply to the Prescribed Authority, as decided upon by the ER Committee, for approval under this scheme provided they satisfy the following:
- 11.2.1. Well defined ER Pilot programs and with proper documentation procedures
- 11.2.2. Maintain separate accounts for the Pilot expenditure

11.2.3. The audited accounts for each year maintained separately for each approved ER Pilot shall be furnished to the competent authority by 31st day of October of the succeeding year

11.2.4. Expenditures, which are directly identifiable with approved ER pilot program only, shall be eligible for the weighted tax deduction. For the purpose of incentive, expenditure incurred on drilling new wells (maximum of two new wells), associated infrastructure, gas, steam and chemicals cost shall be considered.

11.3 Waiver on applicable cess for EOR and other unconventional oil production projects:

There shall be a waiver, to the tune of [50%] of the applicable cess, on gross production of crude oil from designated wells of an approved EOR / unconventional oil production project, for a period of Ten [10] years.

11.3.1. The waiver on cess shall be applicable for all such projects, onshore and offshore. Under regimes where cess is applicable (Nomination and Pre-NELP) as well as to the fields which were/will be awarded extension under the NELP and Pre-NELP regimes, provided such project is undertaken after the date of notification of this policy. In case of regimes where cess is not applicable, a notional cess shall be calculated, and the equivalent amount shall be reduced from the government's share of profit petroleum or revenue share, as applicable. This notional cess value shall be computed as per the formulation applicable for a Nomination field of NOC (end of last fiscal, i.e. currently 31 March 2017) for onshore and offshore blocks. *For e.g. if we assume a sample field with gross production of 200 barrels of oil per month from such approved project and the designated wells and the crude oil price is USD 50 per barrel, the applicable cess payable would be USD 2000 per month (considering cess @20% of well head price). The operator can avail incentive benefit of USD 1000 per month (50% of applicable cess).*

11.3.2. The waiver on cess would be applicable only if the average crude oil price of Indian Basket during a calendar quarter (quarter of claim) is below EOR reference price (as defined in section 3.11). If during the term of the incentive, the average crude oil price is above the EOR reference price for a particular quarter, the incentive will cease to be effective for that quarter, and any such period will not be deducted from the overall tenure of the incentive period for oil. The average crude oil price for the quarter must be considered as provided by PPAC, MoPNG.

11.4 Incentive for EGR and other unconventional gas production projects: There shall be an incentive equivalent to [10%] of gas wellhead price on the gross production of gas from designated well of an approved EGR / unconventional gas production project for a period of Ten [10] years. The incentive shall be capped at USD 0.6 per mmbtu for offshore fields and USD 0.3 per mmbtu for onshore fields.

- 11.4.1. For offshore fields the incentive shall be in the form of waiver of applicable royalty on the gross production of gas from designated well of an approved EGR / unconventional gas production project.
- 11.4.2. For offshore fields where the royalty applicable on gas produced is less than the total incentive amount (i.e. 10% of the gas wellhead price), the difference between the royalty applicable and the EGR incentive amount can be reduced either from the government's share of profit petroleum or revenue share, as applicable.
- 11.4.3. For onshore field the incentive shall be in the form of discount on the governments' share of profit petroleum or revenue share. For onshore fields where no profit share or revenue share applicable, government will make a budgetary allocation for equivalent incentive
- 11.5 **Incentive for Mixed Projects** (Oil & Gas production together either from ER or Unconventional processes): The incentives for production of crude oil shall be based as per clause 11.3 and for production of natural gas shall be based as per clause 11.4
- 11.6 The incentive will be applicable from the date that ER production commences or an alternative start date as indicated by the Contractor (Incentive Start Date) from the Production wells, duly certified by a third party auditor. It may be noted that the 10 year incentive period will start only after commercial production starts; or from an alternative incentive start date as indicated by the Contractor, whichever of the two is later and will be a continuous period (excluding the periods of ineligibility as in section 11.3.2)
- 11.7 Contractor has to submit a quarterly statement to the ER Committee for availing incentives of the production from the wells approved for ER, the production volumes duly certified by a third party auditor. Government reserves the right to verify the volumes and cross-check the methodology adopted in this regard.

12. Miscellaneous

- 12.1 The ER Committee shall also work towards developing a long term roadmap for building an ER ecosystem and evaluate options/possibilities of strengthening existing institutions by giving them an autonomous status in order for them to serve wider industry participants. The committee may invite members from industry and academia to help shape the long term ER roadmap and the findings from the exercise shall be submitted to the MoPNG within 12 (twelve) months from the date of committee formation.
- 12.2 The ER Committee shall also be responsible for organizing knowledge sharing forums periodically, for wider industry participants as well as global technology and service providers to discuss leading global practices related to ER.
- 12.3 DGH shall have the right to stipulate any further conditions specific to any particular ER method at any point of time. DGH shall also have the right to ask for additional information or details

pertaining to a particular ER project, as may be required, and the Contractor is expected to furnish the same at the earliest.

- 12.4 Government shall have the right to stipulate additional conditions on aspects related to ER or unconventional hydrocarbon production methods at any point during the term of this policy. Further, Government also has the right to terminate the policy on grounds that:

12.4.1. The Contractor submits false statements / documents indulges in fraudulent practices with the intention of taking unfair advantage of this policy

12.4.2. Is adjudged bankrupt by a competent court

12.4.3. Fails to meet statutory obligations as per the governing license/contract

12.4.4. Any other violation of terms as per the governing contract

13. Annexure I: ER Techniques

Tertiary Recovery Methods used for EOR	
Thermal	<ul style="list-style-type: none"> • Hot Water Injection • Cyclic Steam (CSS) • Steam Flooding • In-situ Combustion
Chemical Flooding	<ul style="list-style-type: none"> • Polymer Flooding • Alkali Flooding • Surfactant Flooding • Alkali Surfactant Flooding • Alkali + Surfactant + Polymer (ASP) Flooding
Miscible Gas Flooding/Injection	<ul style="list-style-type: none"> • CO₂ Injection • Flue Gas Injection • Nitrogen Injection • Hydrocarbon Gas Injection • CO₂ + Nitrogen + Hydrocarbon Gas Injection + Flue gas (any combination)
Others	<ul style="list-style-type: none"> • WAG (Miscible) • Foam Assisted WAG • Simultaneous WAG (Miscible) • Foam Injection • Microbial Flooding • Acoustic Technique • Electromagnetic Technique • Injection of Chemicals that generate tremendous heat and gas in-situ • Low Salinity Water injection • CO₂ injection (Immiscible)

The above techniques can be used alone or deployed in combination

Tertiary Recovery Methods used for EGR
<ul style="list-style-type: none"> • Nitrogen injection • CO₂ injection • Any other Inert Gas injection (other than nitrogen or CO₂) • De-watering techniques (chemicals / equipments)

The above techniques can be used alone or deployed in combination

Notes:

1. Any such technology deployment in actual field conditions should be proven to conform to sections 3.1 and 3.2.
2. The list of technologies may be reviewed annually by the ER committee and new technologies may be added to the list if applicable.