

EOR and IOR in the UKCS

Recommendations

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UK Policy and Regulatory Framework Reflections

► Importance of

- Recognising and analysing the change in economic and operating environment
- Legislation to maximise economic recovery
- Incentives to promote EOR and IOR
- Revised guidance on Field Development Plans to increase EOR
- Field information to inform screening
- Collaboration e.g UK PILOT, agreement of EOR targets, Norwegian national petroleum technology strategy (OG21) and the Danish-Norwegian Joint Chalk Research (JCR)
- Pragmatism

EOR Implementation in the North Sea Reflections

- ▶ **HC miscible gas injection and WAG injection can be considered mature technologies** in the North Sea

 - ▶ **WAG is most commonly used EOR technology** in the North Sea, and is recognised as most successful (c55% of 27 projects reviewed)

 - ▶ EOR favours companies with
 - ▶ 'long time perspective'
 - ▶ R&D resources
 - ▶ ability to move opportunities out of the laboratory and into field
 - ▶ access to cheaper, proving grounds
 - ▶ collaborative approaches to shared risk mitigation
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EOR Implementation Reflections (cont.)

- ▶ Reporting sporadic, estimates not always consistent/ comparable
 - ▶ N.Sea regional average RF 46% but range is wide ca.20%-70%
 - ▶ Similarly incremental RF from EOR has range ca.2%-15%
- ▶ Field specifics incl. development history impact EOR increment also size of field, nature of reservoir (sandstone/ carbonate), temperature
- ▶ EOR understanding, practises steadily evolving – collaboration and information dissemination/sharing important
- ▶ UKCS review identifies GI probably as WAG (possibly incl.CO2), polymer EOR and LSWF as most applicable



Potential areas to consider

1. Does a high level review of barriers to EOR is needed to provide initial impetus?
2. Is the evidence base available for EOR implementation?
3. Does Brazil need to develop and implementing an EOR and IOR Strategy?
4. If so, what should it include?

High level review of barriers

Undertake a credible, objective high level study presenting an independent analysis of the issues of low recovery in Brazil's offshore basins

- ▶ This could cover barriers such as
 - ▶ Lack of focus on maximising economic recovery
 - ▶ Lack of fiscal policy stability
 - ▶ Need to reflect changing stewardship model
 - ▶ Poor quality asset stewardship
 - ▶ Lack of collaboration
- ▶ This could be industry, academic or politically led but would aim to achieve (as it did for the UK) a consensus on the range of policy, regulator and industry interventions needed to maximise economic recovery

Improving the evidence base

- 1. Review the various EOR initiatives that have been trialled or recently evaluated for the Campos basin fields and based on the analysis, identify those EOR technologies that afford greatest theoretical potential**
- 2. Develop a screening tool for EOR technologies**
- 3. Complete basin wide screening of potential EOR technologies**
- 4. Complete a field level screening of EOR technologies (for fields where reserves are greater than an agreed threshold amount)**
- 5. Validate the findings of the field level screening with operators and confirm scale of unrisks EOR opportunity**
- 6. Prioritise the unrisks potential EOR opportunities by factors such as scale, timeframe, infrastructure requirements and investment needed**
- 7. For those prioritised EOR opportunities, consider developing a reservoir management strategy for each play**
- 8. Identify opportunities for for cooperation between operators to share infrastructure such as onshore facilities**
- 9. Focusing on those prioritised EOR opportunities provide an assessment of the scale of the risks (Economic) EOR potential (broken down by field and EOR technology)**

Potential for a Strategy

Could include

► Objectives

- Focus on maximising recovery (in order to ensure the focus is on the long term ultimate recovery of a field, rather than the short term recovery)

► Targets

- Provide quantified time limited targets for the increase in recovery rates (so for example, aiming to increase final recovery rates from the Campos Basin by 10% within 10 years or to ensure recovery rates on the Campos Basin are increased to align with international averages within 15 years)

► Actions

- New schemes
- Research and new technologies
- Incentives
- Knowledge and learning

Example actions

Knowledge and learning

- ▶ **Establish EOR working groups** to share knowledge and experience and to co-ordinate action to address economic and technical challenges
- ▶ **Develop a shared library** of information on EOR including an inventory of EOR projects
- ▶ Consider examining **other offshore EOR activities** in other operating environments (which have potentially common offshore geologies)
- ▶ **Develop and disseminate guidance** on best practice
- ▶ **Establish an annual operator seminar** - could build on the ANP workshop
- ▶ Consider **establishing an award** for the most innovative and effective EOR technologies
- ▶ Establish and develop links with **international and overseas bodies** e.g. SPE's Tulsa EOR Conference, IEA EOR Workshop and Symposium, EAGE IOR Conference
- ▶ Explore the potential for **research and development funding** to address technological challenges and reduce costs/risks



Remember

Importance of

- ▶ Evidence
- ▶ Incentives
- ▶ Collaboration
- ▶ Risk sharing
- ▶ Shared learning
- ▶ Pragmatism

And keep focusing on ‘the size of the prize’