GAS & OIL TECHNOLOGIES (GOT) INITIATIVE

Update to EOR as CCUS Conference

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INTERNATIONAL ENERGY AGENCY
GAS & OIL TECHNOLOGIES (GOT) INITIATIVE

Overall focus

Explore the strategic role of oil and gas technology in the long term energy future

- Energy Security
- Environmental Protection
- Economic Growth
- Engagement Worldwide
The need for mobility means long term reliance on oil and gas

The PLDV fleet worldwide is projected to expand from around 900 million in 2012 to over 1.7 billion in 2035, with most of this growth coming from non-OECD countries.
In the next 20 years, investments will total $850B to maintain supply (IEA)

1% would yield $85B for R&D
Creating Value – Role of Technology

Approach:
1. Establish current unit cost levels
2. Identify the most important cost drivers
3. Analyse effect of cost compression after recent oil price reduction

Cost = Unit cost \* Volume
Volume = Activity \* Complexity

Total cost: Observed and projected E&P spending
Volume: Observed activity indicators such as rig days.

Complexity can be addressed with technology development and is normally driven by three factors
• *Nature given challenges.* F.ex. harsh environment, complex reservoirs or deep waters
• *Maturation of fields/basins.* F.ex. depleted reservoirs
• *Work processes and/or regulations*
Huge variation in EOR levels worldwide a challenge

Increased recovery from existing fields, NCS
How will GOT address this challenges?
A multi-party, cross-functional global initiative

GOT Dialogue

- Sustained Technology Innovation & Deployment
- Safe, efficient and environmentally benign oil and gas

Technology R & D

- E & P RD & D spend
- global engagement & leverage
- knowledge exchange & accumulation

Potential Policy Measures

- Targeted Incentives
- Fiscal Measures
- Standards/Regulations
- Procurements
- Taxes/Credits
- Others

11 Lab Study
GOT Focus Areas & Workstreams

GOT IA Focus Areas & Workstreams

Focus Area 1: Conventional HC Technologies

Focus Area 2: Licence to Operate Innovation

Focus Area 3: Unconventional HC Technologies

GOT Workstreams

- Offshore:
  - Greenfield Development and Exploration
  - Brownfield Development
  - Midstream Gas

- Cross cut:
  - Safety Technology Innovation
  - Innovation and Risk Management
  - Emergency Response Solutions

- Onshore:
  - Upstream Oil
  - Upstream Gas
  - Midstream Gas

Innovation Challenges and Responses (across the E & P value chain)
Technology Forums Held
• Washington, DC
• Beijing
• Perth
• Rio de Janeiro
• Houston

Technology Forums Planned
• Brussels – Oct 27-28 (UCR)
• 2016 TBD
GOT Green & Brownfield Technology Studies

HC Resources

Conventional

Assessments:

Conventional Greenfield Technology

Conventional Brownfield Technology

Unconventional

Proposals from TNO and Rystad

Peer review panel planned
THE STUDY

GOT IA has initiated a study on the value of closing important technology gaps within the E&P industry.
Three reports will be written. Each report addresses a specific scope defined by GOT IA:

GOT Study Scope 1: Challenges in relation to unconventional gas and oil
A. Hydraulic fracturing and stimulation methods and techniques to enhance
   B. recovery
   C. Water use, drinking water and disposal of wastewater
   D. Air emissions related to unconventional hydrocarbon production
   E. Technologies for best drilling practices and inspection
      Reducing footprint: Air, water, waste and, community impacts

GOT Study Scope 2: Development technologies in greenfields and frontier areas
A. Enhanced reservoir characterization and modeling
B. E&P – technologies, operations, safety and environment practices for harsh environments
C. Development of efficient/low cost small fields
   More efficient resource and environmentally friendly utilization of associated / stranded gases
D. Maximum exploitation of petroleum resources in producing oil fields
   Enabling production of stranded oil in mature oil regions, e.g.
   Immobile oil
D. Enhancing gas recovery/economic field life of gas fields
   Extending economic life time of producing fields
THE STUDY

The final three reports will contain the following main elements

1. CHALLENGES

This part will establish the main challenges within the scope of study through analyzing:

• Historical exploration and production and field development
• Decomposing E&P spending into activity, price and productivity
• Current challenges related environmental impact and social license to operate
  Other factors representing main challenges

2. KEY TECHNOLOGIES

This part will identify key technologies likely to solve the main challenges. It will also assess and quantify how these technologies are likely to affect resources, environmental impact and social license to operate.

3. IMPACT

This part will quantify the global impact of each new key technology in terms of cost reductions, increased resources or reduced environmental impact. Aggregated results will be presented and discussed.
GOT ... From awareness of the problem to the development of a solution

- Global workshops & roundtables
- Studies & analysis
- Global dialogue & collaboration

Technology development + regulatory & policy drivers = safer and more sustainable development
Thank you for your attention