Executive Summary

Technologies and meeting global energy needs

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Oil and gas will continue to represent the bulk of energy demand throughout the first half of this century. The ability of oil and gas industry to deliver hydrocarbons required is depending on its track-record in expanding reserves, recovery and production. Sustaining such trends is depending on technology among other factors.

Technology has always plaid an important role in the oil and gas industry. It has been for example the case of North Sea. Despite the drop of the oil price in 1986, production increased thanks to new technologies made available. As a result, more than 42 Gb has been produced in 30 years, representing 3.5 times the proven reserves estimated in 1980. Even though all technologies are not always transferable in different environments, new technologies specifically designed for different geological settings could pave the way to reserve and production growth worldwide.

In the future, new technological advances will push back the limits of hydrocarbon resources. Improving recovery is a major challenge. An increase of 1% of the recovery factor represents a growth of 2 years of world reserves. Different technologies are under development such as 4D seismic, multilateral wells, enhanced oil recovery processes...

Many new fields to be discovered in the next 25 years are likely to be in extreme conditions. The frontier areas are located in deep water, Arctic or deeply buried reservoirs: exploration and production of these fields are depending on new materials and technologies in seismic, drilling...

Heavy oil and bitumen constitute a very large resources base world wide. This resource of non conventional oil is almost untapped but thanks to new technologies in upstream and downstream (steam flooding, in situ combustion, deep conversion...), major investments are considered.
So technology may contribute to increase the hydrocarbon reserves and production. But at the same time, it will provide solutions to curb the greenhouse gas emissions to the atmosphere. Two major routes are considered: improving energy efficiency specifically in the transport sector and developing CO$_2$ capture and underground storage.

Diversifying energy sources for the production of motor fuels is the last technological challenge. In this respect technology is focusing on production of transport fuels from natural gas, coal or biomass.

Technological progress is requiring investment and long lead times are often involved. R&D spending must remain strong. However judging by the trend of last two decades, this is not what's happening. The overall decline in R&D effort could be a worrying sign that technological progress might be slower over coming years than in the past.

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So, technology has played in the past an important role in the oil and gas industry. It will contribute to increase significantly the world oil resource base for the years to come. Technology development is also focusing on climate change challenge and diversification of energy mix. Adequate funding of R&D spending is required and may be achieved thanks to increased cooperation between producers and consumers.
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Panel Discussions
IEFS
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Impact of technology on production from the North Sea (10 Kb/d)

1975-1979: 1986 proven technologies

Source: I.E.A., EU Commission
Renew and Increase World Hydrocarbon Resources

- Increase the exploration success rate
- Improve the recovery rate of oil in place
- Develop high technological content hydrocarbons
- Promote the development of natural gas
New conventional resources

Arctic basins

Deeply Buried Reservoirs

Ultra Deep Offshore
Non conventional oils

Heavy and Extra Heavy Oils
The Climate Change Challenge

- Improving energy efficiency
- Developing CO2 capture and storage

(source IPCC)
Diversification of energy mix

- GTL
- BTL
- CTL
The strong need of R&D

R&D Spending of major companies

Million US $

Source: IEA, Schlumberger