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CHALLENGES TO THE DEVELOPMENT OF UNCONVENTIONAL NATURAL GAS – THE CASE OF SHALE GAS

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Introduction

The world is making a radical transition to a low-carbon economy, reducing dependence on fossil energy, and adapting to climate change.

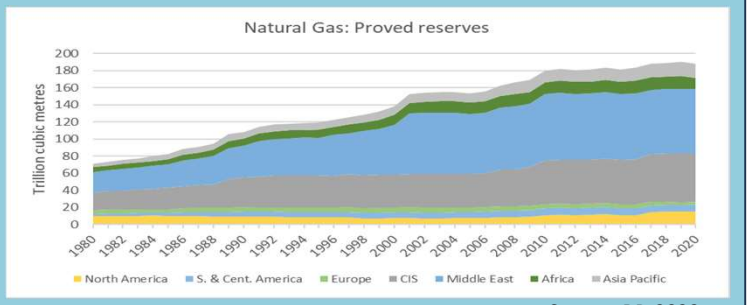
Low-carbon energy is an energy source that produces less greenhouse gas emissions than traditional energy sources such as wind, solar, nuclear and includes natural gas.

In the current context, natural gas is considered as an intermediate energy source in the process of mankind's transition from traditional energy sources to renewable energy due to its superior properties.

According to the IEA scenarios in the "World Energy Outlook" reports from 2010 to 2020, the demand for natural gas will increase steadily, but the magnitude of the increase will vary from year to year and from region to region

Thanks to improved exploration methods, the world's natural gas reserves are increasing. In particular, the recent rapid development of technology has allowed people to exploit unconventional gases that are considered to have very large reserves. The contribution to the increase in the current gas reserves in the world is mainly focused on the discovery of unconventional gas sources, especially shale gas.

At the end of 2020, according to BP statistics, proven natural gas reserves are around 190 Tm^3 which equates to almost 50 years of consumption at current levels

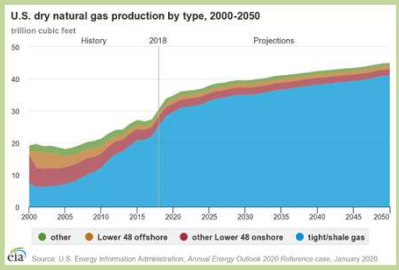


Source: BP, 2022

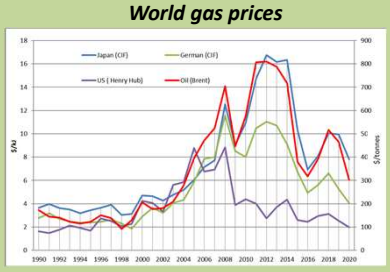
Potential and development of unconventional gas

From 2005 up to now, the development of shale gas in the US has become a phenomenon, a revolution in the energy field. This development has had a lot of impacts not only on the US gas market but also on the global gas market.

The shale gas revolution has already led to economic benefits and cost reduction at the state and local levels, individual sectors, and the nation



World gas prices



Forecast of recoverable natural gas resources in the world

Region	Traditional gas (Tcm)	Unconventional gas		
		Shale gas (Tcm)	Tight gas (Tcm)	Coal-bed methane (Tcm)
Eurasia	134	10	10	17
Middle East	103	11	9	-
Asia Pacific	44	53	21	21
North America	50	66	11	7
South America	28	41	15	-
Africa	51	40	10	-
Europe	19	18	5	5
Total world	429	239	81	50

Source: IEA, 2018

Unconventional gas is considered increasingly playing an important role in securing the global natural gas supply. According to forecasts by the international energy organization, unconventional gas will account for more than 60% of the increase in total gas production in the period from now to 2040. However, estimates of unconventional gas resources are very different around the world. They depend on many factors such as geological information, technologies, and methods used, the number of exploration drilling. Outside of North America, the unconventional gas industry is still in its infancy and important questions still need to be answered.

The challenges of unconventional gas development

- The water demand is very strong
- The capacity of pollution of the groundwater and surface water
- Generation of greenhouse gases
- The production cost and price of natural gas
- The opposition from the population
- The uncertainty of resource estimation

Conclusion

Natural gas is a clean energy source, so the demand for this resource will inevitably increase in the future

Natural gas is an effective medium to short-term choice, a bridging energy medium while humanity is waiting for the transition of energy from traditional to renewable energy sources

Unconventional gas resources in general, shale gas in particular, is an important additional gas source when conventional gas is running out. It can therefore play a major role in terms of energy security in the future.

The problem of unconventional gas is complex, and the impacts are only partially known. Unconventional gas resource estimates are highly variable and uncertain. So, developing these unconventional gas resources will face many challenges. These will be huge barriers that strongly affect the prospects as well as the role of unconventional gas in particular, natural gas in general in the energy transition in the future.