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Opinion

Understanding Energy Crisis

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Abstract

In this paper methane produced from gas hydrates as unconventional energy source is considered as future reserve in energy requirement. Unlike conventional traps, which are a prerequisite for the accumulation of oil and natural gas, gas hydrates can form their own trap within the pore space and expand themselves against the sediment load in the form of massive gas hydrates. This gas hydrates energy resource is estimated as 7, 00,000 x 1012 Scft. In India the total reserve is estimated at 80,210km2. If solar energy is also utilized along with gas hydrates energy the future will be secured for some more decades. Solar energy and gas hydrates will cumulatively solve energy related problems.

Methane (CH4), the most common form of natural gas associated with petroleum reservoirs, is in gaseous state at standard temperature and pressure conditions. But under high pressure and low temperature, it combines with water molecules to form an icy-white compound called methane hydrate. Thus it contains huge volumes of gas e.g., 1m3 of solid hydrate (theoretically) contains up to 164m3 of methane gas at standard pressure and temperature. Methane produced from gas hydrates is truly unconventional because of its origin, trapping mechanism and production technologies. Unlike conventional traps, which are a prerequisite for the accumulation of oil and natural gas, gas hydrates can form their own trap within the pore space and expand themselves against the sediment load in the form of massive hydrates.

World Scenario

Worldwide, about 60 locations of gas hydrates have been identified in the onshore (permafrost) and offshore regions. The most important among permafrost areas include Siberian Basins (Russia), Prudhoe Bay (Alaska, USA), Mackenzie Delta (Canada) and Arctic islands. Some typical offshore continental margins include Gulf of Mexico, Oregon, Blake Ridge (USA), Narikai Trench (Japan), Chile triple junction (Chile), Makran Accretionary Wedge (Pakistan) and offshore regions of Indonesia, Korea, Peru, India and Nigeria. Global estimates of natural gas (methane) in hydrates are astounding. A "consensus value" of about 7, 00,000 x 1012 Scft suggests that methane hydrate contains two orders of magnitude more carbon than all other fossil fuels on the earth.

Indian Scenario

Following are the salient features of the Indian gas hydrate exploration:

1. The Bay of Bengal- unique in its geological, geochemical, thermal regime, and possessing large volume of gas hydrates is a potential area for exploration

2. The Krishna-Godavari (K-G) offshore is the most favourable area in the Indian passive margins with thick sediment deposited from Miocene to Recent in a growth fault environment

3. The areas lying between 600-2000m in water depth off the coasts of Mahanadi, Godavari and Krishna River deltas are likely to emerge as a huge storehouses of massive hydrate deposits

4. Andaman-Nicobar arc basin displaying favourable geological, geochemical and geophysical attributes, also offer locations for huge hydrate deposits.

In India the total reserve (Western offshore + Eastern offshore + Andaman-Nicobar offshore is estimated at 80,210km2). Nevertheless, the majority opinion is that methane obtained from hydrate is a clean form of energy and should be considered as a favourable future resource. However, the most important question posing the scientific community is, "will the gas hydrate become a significant energy resource in the near future?" The worldwide opinion on this essential question is that it is unlikely before 2030. But some countries like India, Japan and South Korea are of the opinion that it may become a critical sustainable source possibly by 2025.

Understanding Energy Crisis

Any activity in this world is directly or indirectly related to the Sun. This solar energy could be utilised as a solution for energy crisis and only for peaceful purposes. Planning to utilise solar

energy is a continuous and long time solution. Before developing solar energy in full swing in the future, we have to now concentrate on available sources and resources. As a supplement to available energy gas hydrate (Methane) could be utilised to augment energy resources.

The total reserve of Gas Hydrates (Methane) is sufficient for few more decades in the World Scenario of energy. These Gas-Hydrates are very useful for constructive purpose to promote peace and prosperity to the mankind. These deposits in continental slopes can be burnt by bombarding and releasing methane gas by using submarine warships. These deposits are also non-nuclear lethal weapon in a war.

In another two or three decade, the solar energy in the form of instruments and devices will change the world. The Solar energy is inexhaustible and available for all the countries in the world. Only in Arctic and Antarctic regions some problems may be encountered in utilising solar energy. In order to solve the energy crisis, we have to understand each other with an optimistic view. No energy is permanent except solar energy. In this aspect we are all standing under the truth. But we should not conclude that truth is not only unknown but also unknowable. From ice ages the temperature has risen to the present value in the globe. So global warming is natural process.

But unnatural component of global warming should be controlled. The carbonate compensations depth (CCD) in the deep ocean will fluctuate to accommodate even increasing carbon-di-oxide and carbonate. In CCD all carbonates will be dissolved. Solar energy and gas hydrates will help us to solve many energy related problems. However carbon capture and storage (CCS) will continue for many decades, because Co2 problem will be more, if gas hydrates are used as energy source. So the combined use of solar and gas hydrates as energy sources will pave way for better life in this planet. No oceans No nations. The future is green and green only.