***Annexure***

***Concept note : Conference on Future of Natural Resources (Hydrocarbons, Rare Earth Metals and Blue Economy)***

 *“Blue Economy” is defined as sustainable use of ocean resources for economic growth, improving livelihoods and employment while preserving the health of ocean ecosystem. The blue economy comprises a range of economic sectors and related polices that together determine sustainable use of ocean resources. India has a unique maritime position. Its 7517km long coastline is home to nine coastal states and four union territories with 1382 islands. The country has 12 major ports and187 non-major ports, handling about 1400 million tons of cargo every year, as 95% of India’s trade by volume transits by sea India’s Exclusive Economic Zone (EEZ) of over two million square kilometres is rich in living and non-living resources. It holds significant recoverable resources of crude oil and natural gas. The coastal economy also sustains over 4 million fishermen and other coastal communities. With these vast maritime interests, the Blue Economy in India has a vital relationship with the nation’s economic growth.*

 *Fisheries, aquaculture, offshore renewables, hydrocarbons, seabed mining, rare earth metals, blue biotechnology, marine and coastal tourism are all becoming important economic drivers to a range of sectors. Fisheries, aquaculture, offshore renewables, hydrocarbons, seabed mining, rare earth metals blue biotechnology, marine and coastal tourism are all becoming important economic drivers to a range of sectors. Several countries have undertaken initiatives to harness their ocean resources through the concept of blue economy. For instance, Australia, Brazil, United Kingdom, United States, Russia, and Norway have developed dedicated national ocean policies with measurable outcomes and budgetary provisions. Canada and Australia have enacted legislation and established hierarchal institutions at federal and state levels to ensure progress and monitoring of their blue economy targets.*

*Gas hydrates are naturally occurring, solid compounds containing natural gas(mainly methane) and water. Natural gas is a clean transition fuel between the high-emission hydrocarbons and the near-zero emission renewable energy systems. Throughout the past two decades, scientific interest in gas hydrates increased tremendously and research is driven mainly by interest in the potential future role of gas hydrates as an energy resource, and by the role of methane as a strong greenhouse gas and contributor to global climate change. Further interest is linked to the geo hazard aspect of gas hydrate occurrences (especially in the marine environment) related to sea floor subsidence, slumps and slides. It is estimated that during the period 2019-47,India needs a cumulative natural gas import of 4.3 trillion m 3 (tcm) for a cost of ~US$ 0.4trillion. Depletion of fossil fuels, increasing crude oil prices, growing demand of clean energy, and uncertain supply coupled with the geopolitical scenario necessitate research for an alternate source of energy for sustainable development of an energy-deficient country like India. Globally, the recovery of methane from NGH is a scientific and technological challenge, and much remains to be understood on the geologic, geophysical, biological, engineering and the economic factors controlling the distribution and its formation/dissociation mechanism and ultimate recovery of the deep-seated resource. Reservoir-specific scientific and technological understanding is needed to develop production strategies by taking into account of the spatial distribution, benthic ecology petro-physical properties, technological feasibility and environmental impact. By considering the above facts under the aegis of Ministry of Earth Sciences,Government of India, a comprehensive research-oriented gas hydrates program is in progress to estimate the resource availability in the Indian continental margins with science and technology development for exploration and extraction feasibility. Detail exploration activities are in progress pertaining to the identified sites at Krishna –Godavari Basin and Mahanadi basin with the joint efforts of organization such as National Institute of Ocean Technology (MoES) for Technology development and National Institute of Oceanography (CSIR) and National Geophysical Research Institute(CSIR) for scientific understanding.*

*Following are some of the aspects of Gas Hydrate research that need immediate attention of the research community in India:*

*a. To undertake regional scale gas hydrate distribution to identify promising sites and estimate resource potential by geophysical and geological exploration at selected sites*

*b. To Understand the process of generation and accumulation of hydrates in marine sediments*

*c. To develop and utilize exploration technology and ground truth validation tools for demonstration of methane hydrate existence*

*d. To develop research methodology and technology for environmentally safe technology for pilot scale production*

*e. To understand the impact of gas hydrates dissociation on geological environment and climate  and establish mechanism for monitoring and management during harvesting of gas hydrate*

*Depleting terrestrial mineral deposits and increasing demand for strategic metals have enhanced our interest in deep-sea mineral mining. The major marine mineral resources such as Polymetallic Nodules (PMN), Polymetallic Sulfides (PMS) and Cobalt-rich crusts found in the deep-ocean are distinct in their metal contents, abundances, global distribution, processes of formation, associated ecosystem etc., and hence, the exploration and exploitation attributes are different in terms of technology, scientific, economic and regulatory aspects. India, a maritime country with a rich maritime heritage is actively engaged in exploring the resourceful ocean bed for meeting the future metal demands of the country.*

 *The marine mineral deposits are rich in base metals and as well many strategic minerals and rare earth elements (REEs), make them attractive for commercial exploitation in the future. The growing demand for advanced and green technologies and standard of living in daily life is fueling a steady increase in the need for many metals and minerals. Most of these metals have strategic and many irreplaceable industrial applications. India, a fast-developing country having ambitious sustainable and development goals dwells in mineral resources. The long coastline of India and its proximity to the vast oceanic domains, as well as the long marine scientific history of the country, demands venturing into the oceanic domain for exploring and utilizing the huge treasures of mineral resources in the deep-sea domains.*

 *The International Seabed Authority (ISA) has developed regulations, including provisions relating to environmental protection, to govern deep-sea explorations. ISA has approved 29 exploration contracts in the Pacific, Indian, and Atlantic oceans. In the Indian Ocean, one contract for PMN (India), and 4 contracts for PMS (India, China, Korea, and Germany) have been granted (www.isa.org.jm).*