

REQUEST FOR EXPRESSION OF INTEREST

Hydrogen Transmission in Natural Gas Pipelines in India

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Country: India

Description of procurement:

India's national gas grid of common carrier pipelines with a network of 33,500 km, of which 20,500 km is operational (as of March 31, 2022) and 13,000 km is under construction, can provide the appropriate incentive basis for incorporating low carbon hydrogen in India's energy mix. In this context, The Petroleum and Natural Gas Regulatory Board (PNGRB) along with The World Bank are exploring the possibility of blending low carbon hydrogen in existing and upcoming Natural Gas (NG) infrastructure across the country to increase the share of clean energy. A combination of repurposing the existing NG pipelines along with creating new infrastructure, if required, can provide the requisite boost to a Made-in-India low carbon hydrogen value chain, in line with the vision of Government of India. This approach, among other aspects, would improve the utilization of existing trunk pipelines, aggregate hydrogen demand from low carbon hydrogen producers, familiarise consumers with operating conditions of a new fuel, and prepare consumers (domestic, commercial, and industrial) in utilizing blended hydrogen before a probable transition to 100% hydrogen utilization.

The assignment, thus, aims to explore the extent of low carbon hydrogen blending possible in India along with developing an understanding of gaps, if any, in supportive regulations. The assignment, with an aim to accelerate the process of developing a hydrogen economy, would identify the measures needed across the low carbon hydrogen value chain, establish the feasibility and viability of utilizing existing infrastructure for hydrogen transport at different levels of blending, benchmark established processes, standards, and regulations with global best practices, propose policy and regulatory measures, and chart a way forward for India.

Scope of Work:

The assignment is expected to undertake below tasks:

1. **Market assessment:** Assess the demand for low carbon hydrogen, sector-wise and district-wise, up to 2040 (in five-year intervals), at different levels of blending and map it with respect to India's national gas grid of common carrier pipelines (existing and planned). The consultant would refer and shall utilize the existing GIS-based Hydrogen Hub mapping exercise that the World Bank is doing already.
2. **Techno-commercial assessment of supply side technologies:** Assess techno-commercially the entire value chain of low carbon hydrogen including production, storage, blending, transportation (through pipelines, road etc.), distribution, and de-blending (if required), and establish its cost competitiveness with respect to other available low carbon alternatives. The assessment would also include fine-grained analysis of the multiple steps involved in the value-chain of low carbon hydrogen to clearly identify [a] risks and threats; [b] barriers; [c] bottlenecks; and [d] constraints which may limit the transformative and scaling up capacity of the sector in India. As mentioned in Task 1, the input, capital and production costs etc. would be benchmarked at five-year intervals

up to 2040. The consultant would also draw up business models for use of low carbon hydrogen into the gas system (blended or deparated).

3. **Transportation of blended hydrogen in existing NG pipeline infrastructure:** Analyze hydrogen blending limits in distribution system in India and benchmark it against the global best practices. The analysis would include different end user markets for natural gas (including CGD network) and would enunciate the tolerances for deviation in gas quality/ interchangeability in each market, type of existing equipment/process as well as cost of upgrades/conversion of end user equipment in case supply of low carbon hydrogen (with varying blending percentages) is operationalized through the existing infrastructure. Further, in addition to various end user markets, the analysis would also establish the cost and commercial feasibility for upgradation/repurposing the existing pipeline infrastructure for different hydrogen blending percentages.
4. **Regulatory framework:** This task would include the following sub-tasks: [a] mapping the regulatory structure for hydrogen in selected international jurisdictions; [b] benchmarking the global standards for hydrogen storage, transportation and distribution for repurposed NG infrastructure and providing a summary of regulations introduced internationally to support blending of hydrogen with natural gas in pipelines; [c] reviewing existing PNGRB regulations, identification of gaps in existing regulations (including technical and safety) for blending of hydrogen and suggest required changes; [d] identify key initiatives and plans across the globe for enabling partnerships and policy changes required for establishing a hydrogen economy.
5. **Roadmap for transmission of hydrogen:** Develop a roadmap for transmission of hydrogen through the existing as well as new oil and gas pipelines/network.
6. **Stakeholder engagement:** All the aforementioned tasks would be informed by requisite engagement with key stakeholders including but not limited to end-users (domestic, commercial, industrial), technology providers across the entire value chain (including production and usage of low carbon hydrogen), low carbon hydrogen producers and regulators in international markets such as USA, UK, EU, Australia, inter alia.

Eligibility Criteria:

Key qualifications of the firm/consortium should include:

1. Demonstrated capability of working on technical and commercial aspects of oil and gas pipeline network.
2. Demonstrated capability of working on process industries towards decarbonization.
3. Demonstrated technical capability of handling hydrogen and its applications.
4. Demonstrated experience of having undertaken policy and regulatory interventions for oil & gas sector. Desirable to have experience in India.

For more information, please email to info@tenderingprojects.es