

F. No. M-12026/8/2016-Part File(coal)
NITI Aayog
Government of India
(Energy Vertical)

NITI Aayog, Sansad Marg,
 New Delhi
 Date: 24/11/2020

Subject: Minutes of the 3rd Meeting of Technical Standing Group on Coal Gasification held on 3rd November, 2020

List of participants at Annexure-1

At the outset Chairman of the Technical Standing Group, Dr. V. K. Saraswat, Member, NITI Aayog welcomed the participants for the meeting and invited Ministry of Coal to initiate the discussions.

2. Mr. Piyush Kumar, Ministry of Coal briefed that PDIL has been awarded pre-feasibility studies for the 4 projects of the Coal India Limited and this meeting has been organized to examine the work done so far by PDIL for feedback of the Technical Standing Group and suggestion on how to make these projects successful.

3. Mr. Ashutosh Prasad, PDIL in its presentation indicated that four subsidiaries of CIL have awarded contract to PDIL in June 2020 for conducting Pre-feasibility studies for coal gasification projects in the Eastern Coal Field Limited (1 MTPA coal), Western Coal Field Limited (1 MTPA coal), Southern Eastern Coal Field Ltd. (1.5 MTPA coal) and Central Coal Field Ltd. (2.5 MTPA coal). He informed that the products of coal gasification will be determined by market research which is presently being conducted by Deloitte. He told that advantages and disadvantages of different technologies of coal gasification have been estimated on the basis of the Talcher Project Experience and the interactions during China and JSPL Visit. It was also informed that the coal quantities have been identified by the CIL subsidiaries. The final coal requirement will be determined once downstream process is identified. It was informed that the market study by Deloitte will be the basis for detailed in-depth study of pricing, demand and forecast of the products identified.

4. Dr V K Saraswat, the chairman of the Technical Standing Group raised the concerns of appointment of Deloitte and was of the view that the study should include end to end products starting from coal mining to marketing of chemical products out of gasification projects. He also enquired PDIL that the parameter based on which quantity of coal has been decided is not known. The Deloitte is a general consulting company and may not have idea of the process involvement of coal gasification based products, further they have never interacted with NITI Aayog which is piloting this coal gasification and methanol projects. Commenting on PDIL's presentation, Dr Saraswat told that the technical performance data of gasification process hasn't been shared by Chinese companies and even no comparison of technology was done in case of Talcher Fertilizer Limited project. He further indicated that Chinese data is superficial and PDIL hasn't done any study with the suitability of technologies. This is completely one sided approach

considering the marketing aspect without accounting coal gasification details. Such survey will be erroneous without taking all stakeholders into account. This kind of approach will land in an unprofitable venture. The data shown in the comparison of various technologies by PDIL is only theoretical. Experimental data from various sources is needed to account before we make our choices. He also suggested that it is important that detailed study on technology choice vis-à-vis coal and final product should be done by some competent agency. The selected agency should find out an appropriate gasification technology for feedstock, feedstock characteristics, Output parameters, Products, Implications of high bottom ash. Further these projects would be highly cost intensive leading to high cost of production of methanol where import of methanol is cheaper.

5. Sh. R K Gupta, HINDALCO raised the issue on the detail of entrained bed gasifier and its advantages. He told committee that there are many working plants in China. More technical information of such plants will be helpful for the committee to decide upon the choices of the technology.

6. Dr. R R Sonde endorsed the opinion of Dr Saraswat for roping in a professional agency to conduct coal gasification survey. Also he added that in fluidized bed there is no fly ash accumulation. He insisted that there is a need to do proper estimation of technologies vis-à-vis type of coal available at different locations. The cost of blending also need to be factored in. Taking cue from China is not the right approach.

7. Dr Prakash Chavan, CIMFR raised the concern that PDIL has missed the comparison of Bubbling Fluidized Bed Gasifier in the comparison. He told that apart from main line products, gasification also lead to generation of certain by products such as Nitrogen, Carbon Dioxide and these too should be taken into consideration for utilisation while choosing the technology.

8. Sh. Neeraj Sinha, NITI Aayog told that the NITI Aayog is already planning for using methanol as alternative fuel. Generation of byproducts from the gasification also need to be considered. PDIL job is incomplete if methanol estimation has to carry out by NITI Aayog. While framing the study, the discussion with NITI Aayog will be helpful.

9. Sh. Asit Das, RIL informed that reliance is operating all entrained bed gasifier at 1500 °C using high ash Indian coal. He raised the concerns regarding the thermal efficiency impact on high ash on gasification process and impact of refractory and nature of ash on slag formation. He opined that the technology has to be evaluated very thoroughly before selecting it, because we have numbers issues in the entrained bed gasifier. Sh. Das also told the committee that the Air Product design is having very high CAPEX and OPEX and with the current cost of LNG, how the coal gasification based projects will ensure an IRR 12% to compete with LNG.

10. Dr Anjan Ray, CSIR-IIP stated that the product ranges need to be taken a closure look considering SASOL and Chinese technologies. He added that no site specific differences have been highlighted in the PFR by PDIL. Also, he told that India has very tight target on climate obligations and these processes are net GHG generators, therefore, a detailed analysis is required.

11. DrS R Chakraborty, IIT Madras suggested to consider bubbling bed gasifier. He laid importance for process optimization to keep a check on OPEX. He also added that the committee should work towards laying guidelines for coal with 30-40% ash, for its utilization.

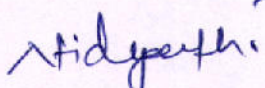
12. Dr Shantanu Roy, IITD told that there is a need for techno-economic assessment of the selected technologies. He also suggested that common document should be prepared at national level for design and technology selection.

13. Dr Venkatraman, enquired about the CAPEX and the price of methanol production at Dankuni project with PDIL. He was of the opinion that methanol cost for Dankuni appears to be very high. He stressed promotion of indigenous technology and Atmanirbhar Bharat.

The following Decisions were taken:

1. The pre-feasibility studies carried out by PDIL for the given 04 sites of CIL, have neither taken into various country experience on coal gasification in depth nor it created a detailed comparative study of various technologies options with respective SWOT Analysis.
2. The study made by PDIL is based on experiences gained during China and Talcher visits and information provided by Air Products. This approach is not correct and it further significantly risks the decision making process of the national investments.
3. There is a need to have a detailed assessment by an agency which can take into account end to end analysis including the feedstock analysis, processes of coal gasification, portfolio of chemicals products at each site, all the raw materials, product mix which can be utilized, power generation and every process related to coal to gas including gas cleaning, SNG for energy production and all raw material water, energy and effluents and environmental & social aspects.
4. The evaluation should also include viability assessment with other fuels like LNG and other fuels. Ministry of Coal need to broaden the scope and identify professional agency to conduct complete detail including international agencies/domestic agencies to come out with suitable technology recommendations for coal gasification projects for identified coal fields.
5. In this context, Hon'ble Chairman told that he will provide technical "Terms of Reference (ToR)" of the study. The tender can be released after deliberation of "ToR" by the Technical Standing Group.

The meeting ended with a vote of thanks to the chair.


(Navin Kumar Vidyarthi)
Director (Energy)

Tentative Terms of Reference

Aim of this Terms of Reference is to prepare a Techno-Strategic-Financial Compatibility study for the "Development of Coal Gasification based Methanol and Other Chemicals Ecosystem & Possible Environmental Impact Assessment" for various possible sites of the Coal India Limited.

The study should utilize and apply the specific learning's from gasification projects around the world for the four identified sites in India, and propose the most optimal project configurations for each site and the portfolio and technology options for the gasification of high ash Indian coal to produce an array of chemicals. To conduct the study following should be the Terms of Reference:

1. To perform the comparative assessment of international experiences in gasification, in countries such as USA, South Africa and China in terms of type and use of feed stock, beneficiation, gasification and conversion technologies used, product portfolio, pricing, enabling policies and implementation issues.
2. To perform separate analysis for each of four identified sites where coal gasification projects are prima facie envisaged i.e. Andal, Chandrapur, Mahamaya Coal Fields and Karnapur on the following parameters:
 - a. Feed stock analysis
 - b. Portfolio of chemicals
 - c. Proposed conversion technologies
 - d. Project conceptual design
 - e. Techno-Commercial-Environmental Assessment
 - f. Carbon utilization and Value addition
3. To provide policy recommendation to the Government of India with an aim to lay down a Technology Roadmap Document which will act as a techno-policy decision enabler for the Government of India.

Annexure-1

List of Participants

SL. No.	Name	Designation	Organisation
1.	Dr. V.K Saraswat	Member	NITI Aayog- in Chair
2.	Mr.NeerajSinha	Adviser (S&T)	NITI Aayog
3.	Mr.Rajnath Ram	Adviser (Energy)	NITI Aayog
4.	Mr.Peeyush Kumar	CM (PK)	Ministry of Coal
5.	Mr. Navin K. Vidyarthi	Director	NITI Aayog
6.	Mr. Mr. Ashutosh Prasad	GM	PDIL
7.	Mr. R R Sonde	Vice President	Thermax
8.	Mr. S R Chakravarti	Professor	IIT Bombay
9.	Dr. Shantanu Roy	Professor	IIT Delhi
10.	Mr.PrakashChavan	Principal Scientist	CIMFR, Dhanbad
11.	Mr. Rajesh Kumar Gupta	Senior president and Head	Hindalco, Sambalpur
12.	DrAnjan Ray	Director	CSIR-IIP
13.	DrShantanu Roy	Professor	IITD
14.	DrT S Venkataraman	CMD	ESVIN Advance Technology Limited Chennasi
15.	Mr.Asit Das	Head R&D and Process Development	RIL
16.	Dr. AbhinavTrivedi	Yong Professional	NITI Aayag