

## **Technical and economic impacts on different methods of improving the performance of a gas pipeline**

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### **Abstract.**

Today, natural gas represents 24.7% of the global energy consumption. Over 106,000 m<sup>3</sup> of natural gas are consumed every second in the world, (3,350 billion m<sup>3</sup> of gas per year). World production of natural gas in 2012 amounted to 3 193 billion cubic meters.

In a context of growing concern of degradation of the environment, first quality natural gas is its non-polluting nature. For this we propose in this article to improve technical performance gas pipelines existing or future, to today, in order to obtain better performance, lower transportation costs, as well as flexibility of use compared to the competing energies. The Algerian exploitation policy, through the Transport activity of SONATRACH, which manages 16,200 km of pipelines, is to maximize revenues by optimizing the recovery and the means of transport by pipelines. There are several methods of improving the performance of a gas pipeline to know:

(1) increase in the diameter of the pipe, 2) increase of the discharge pressure; (3) doubling of compressor stations; (4) cooling of the gas at the beginning of sections; (5) improvement of the strength characteristics of metal component pipeline; (6) decrease roughness of the pipe; (7) monitoring of the integrity of the pipeline; (8) improving the capacity by parallel conduct (looping); (9) treatment of gas initially; (10) Finally it can combine all of these methods together.

Each of these methods has its advantages and disadvantages as feasibility (construction difficulties) and costs generated by the application of the method.

We can enumerate the following cases: the increase in the diameter of the pipeline, whatever limited to 48" or same 56", will greatly reduce the load losses and the number of compressor stations, but will require greater discharge pressures which will increase the temperature of the gas. The latter will not have time to dissipate between stations and therefore will have a negative impact on the flow, hence need to cool the gas. This is not to mention the additional work of civil engineering in relation to the trench, the costs that it induces and the effect on the environment.

The purpose of this article is to list the various problems encountered in the project of a gas pipeline from the technical, organizational and economic point of view. Partial solutions for each case will be offered as well as an optimal solution for improving the performance of a gas pipeline.

**Keywords:** Performance; costs, optimization, heat transfer, reliability.