# A Mechanistic Approach to Subsea Gas Pipeline Capacity Utilization – Case Study


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One of the biggest challenges after the initial gas field discovery lies in the transportation. The natural gas supply is constructed in such a way that transportation remains an integral part of the gas utilization system. This is because the operator has to understand the mechanism behind transporting from the well to the wellhead; from the wellhead to the topside while efficiently avoiding hydrate formation; from the topside to the processing facilities and from the processing facilities to the delivery point for the final consumers.

This paper was structured to address subsea gas pipeline flow assurance issues relating to the initiation of hydrate and internal corrosion. Through experience and extensive literature studies, an Optimization Systematic Model was developed. This model is procedural in nature, incorporating both risk analysis and predictive models. The model was further used to investigate the susceptibility of the case study, Inter-western African Gas Pan Pipeline (IAGPP), to hydrate and internal corrosion. The results of the case study confirmed that the model is helpful in that it can bring flow assurance issues to management focus. This research suggested a new derived equation – the Thermo-Mechanistic Model (T-MM), used to explain in PIPESIM simulation results and the optimization options. The T-MM can be used to understand the behavior of gas enthalpy to variations in gas pipeline flowrate. In general, there is a need to keep gas pipeline capacity optimization in focus; to proactively avert cases of

hydrate and internal corrosion by using the model developed. Learning from the IAGPP case study also shows that there is the need to accurately assess gas availability for transmission.

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