

Стандартная сложность, «НЕФТЕГАЗ»

In the context of a global energy transition, oil and gas will remain an important part of the energy mix, especially in developing countries. The challenge of energy companies is to adapt to a changing policy and investment landscape, and still remain competitive. In this work we present a generalized optimization framework for the design of oil and gas gathering networks accounting for combined shale oil and gas development strategies.

We develop mixed-integer linear (MILP) and quadratically constrained models (MIQCP) to optimally determine the network of pipelines, separation, processing and delivery facilities for both oil and gas. In contrast to previous approaches, the networks are built with no predetermined number of echelons. We assume that there is a set of generic nodes to be connected among themselves to reach the final destinations. By including pressures as decisions variables, flowrates and flow directions can be optimally determined along the time horizon to make a better use of the transportation capacity. Stochastic programming extensions of the models permit to determine the network of surface facilities that maximizes the expected net present value of the project under uncertain scenarios.

Oil and gas prices may significantly change in the future, leaving open the question as to whether the focus will be on developing wells producing more oil than gas, or vice-versa. Shale oil and shale gas wells usually coexist in nearby regions of the same formation.

Therefore, there is a nontrivial decision on where and when to build and expand the gathering networks.