

Latvian underground gas storage facilities for the development of a safe gas and power supply system of North European gas

K. Mikelsons

Latvian Power Company

Dr. A. Davis

Latvian Gas Company

Prof. V. Zebergs, Prof. N. Zeltins

Institute of Physical Energetics, Latvian Academy of Sciences

In order to rise the supply safety of Northern European gas, the underground gas storage (UGS) facilities may be used. The UGS existing in Latvia with the capacity of 4.2 billions m³ is one of the largest in Eastern Europe. There are favourable geological conditions in Latvia for the creation of still other, new UGS with a 10 times larger capacity. Therefore these UGS can raise the gas supply safety not only in Northern Europe but also in Central Europe.

1. The most important functions of the UGS

The UGS can perform several important functions in the development of the energy supply system:

- To raise the gas supply safety (under the conditions of a pipeline damage);
- To reduce the capacity of the supply gas main pipelines;
- To control the gas supply mode corresponding to the changing weather conditions;
- To enhance the development of electricity production.

At the present time the UGS already existing in Latvia perform only a limited number of functions.

2. The UGS efficiency in the free gas market

In the free gas market there will be a wider opportunity for further expansion of the UGS functions to increase the gas supply safety and reduce the gas supply costs. The gas supply companies willing to make investments in the UGS development will increase their competitive ability. This will ensure continual gas supply under changeable weather conditions, as well from the gas extraction places in case the gas main pipelines are not safe.

3. Methods for the evaluation of the UGS efficiency

In order to evaluate the UGS efficiency, it is necessary to simulate various options of operation of the gas supply companies under the conditions of free market using various functions of the UGS operation in order to make maximum profit. According to the long-term prognoses of global energy development, gas extraction and use will still increase and, perhaps, by the year 2040 they will reach maximum. Therefore by using the methods the “life cycle” analysis in economic calculations it will be possible to obtain an assessment from both the economic and energetic, and ecological points of view.

4. The UGS impact on the development of electricity production

The relation between the development of electricity production and the development of the gas system has been well investigated and substantiated. Because of the good long-term gas development perspectives new highly efficient technologies have been worked out for thermal power plants. Such power plants can be built cheaply and in a short period of time. High-capacity UGS create favourable conditions for building powerful peak load thermal power plants with sharply changing loads and variable gas consumption. This allows solving better the “black-out” problems arising under the conditions of free electricity market.