

ELABORATING STRATEGIC FRAMEWORKS FOR DEVELOPMENT OF GAS SUPPLY AND GAS DISTRIBUTION SYSTEMS IN THE REGIONS

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Social and economic progress of Russia greatly depends on adequacy of energy supply development and gas supply and distribution in particular. By their nature energy projects (including gas supply and distribution ones) are long-term, involve a number of implementation stages to arrive at design performance and require considerable investments, which efficiency in existing pricing and tariff context is very low.

The paper aims at development of scientific and methodology approach to elaboration of strategic frameworks for development of gas supply systems in the regions. Our major objectives include:

- System based assessment of factors influencing development of gas supply systems in the regions;
- Design of regional gas supply system development models;
- Devising approaches to assessment of existing systems' technical capacity to provide for increased gas supply;
- Design of information and programme tools to support decision making in regional gas supply development;
- Validation of developed approach by implementing in individual regions.

Major factors influencing gas supply and distribution development in the regions include:

- Topology; technical characteristics and status of the existing gas supply and distribution network;
- Interaction with gas networks in the neighbouring regions;
- Social and economic prospects of the Region;
- Assessment of potential gas demand in the region;
- Unified Gas Supply and Distribution System development outlook in terms of consequent influence over gas supply in the regions.

Mathematical simulation allows to assess regional gas supply and distribution systems in terms of their technical readiness for gas supply increase, development programmes practicability across various criteria. In short, mathematical simulation provides not only for development alternatives assessment, but for justification of the preferable variants as well.

Identification of hydraulic parameters as based on many -year system operating modes analysis and forecast of these parameters expected values present an essential stage in design of adequate models. Such analysis provide for justified approach to technically viable gas distribution networks flow capacity forecasting, bottlenecks identification and development trendsvalidation.

Existing and prospective capacity of the Unified Gas Supply and Distribution System (UGSDS) to supply gas to mid-stream facilities is an important factor to be considered in assessment of gas supply and distribution networks development. Gas flow models p rovide an instrument for Unified Gas Supply and Distribution System capacity assessment. Aggregated UGSDS s chemes should undergo simulation with application of flow problems algorithms. At that gas supply volumes are limited by feeding pipeline flow capacity. Expected UGSDS flows are determined depending on General Scheme of industry st rategic development.

Thus hydraulic calculation of regional gas systems' operation mode together with UGSDS flow simulation and gas supply increase opportunities assessment allow to formulate variants of gas supply and distribution systems development in the regions. Comparative analysis of resultant variants involve a number of criteria (stability of gas supply; scheme viability, constructability, cost -effectiveness, adaptability, maintainability, etc.) and expert auditing.

The above research requires a well-established IT base. At present Gazprom promgaz is developing computer complexes for system solving of the problems above. Universal structure for programme operation information support is already developed. Software will be int egrated in the unified computer office for prompt decision of problems relating to gas mains transportation, storage and distribution present-time, day -average and strategic planning.

The approach above has been validated in the frameworks of preparing recommendation on development of gas supply and distribution in a number of entities of the Volga and Central Federal Districts. Validation allowed to identify bottlenecks of gas supply and d istribution systems and to reveal nature of such bott lenecks (extreme capacity load, facilities' technical limitations, pipe diameter and pressure). Consequently formulated debottlenecking alternatives were agreed with gas transportation entities. Preferred development scheme was identified with application of variant ranging multi-criterion expert scheme as based on hierarchy analysis method.

Debottlenecking schemes together with analysis of expected gas demand (provided tying - in of new facilities to gas distribution stations) underlay staged scheme of extending and reconstructing a number of gas supply and distributio n systems in the region. Development of gas supply in the regions (construction of new gas distribution systems) should be coordinated and aligned with planned development and reconstruction of regional gas supply systems.