ISSN 3060-4567

NEW TECHNOLOGIES IN GAS SUPPLY

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ANNOTATION: *This article analyzes modern technologies in the field of gas supply. In particular, innovative solutions such as smart meters, GIS and SCADA systems, sensor control, as well as biogas and artificial methane production are considered. These technologies play an important role in increasing safety, reducing losses, and ensuring energy stability. The article is intended for use in the modernization of gas networks from a technical and practical point of view.*

Key words: *Gas supply, natural gas technologies, smart gas meters, gas distribution systems, pipeline monitoring, leak detection systems, gas network digitalization, renewable gas, hydrogen blending, biogas integration, lng (liquefied natural gas), cng (compressed natural gas), smart grid for gas, energy transition, decarbonization of gas, advanced gas sensors, remote gas monitoring, gas infrastructure innovation, digital twins in gas networks, sustainable gas technologies.*

INTRODUCE

Gas supply is one of the systems widely used as an energy source for the population and industry. The introduction of technological innovations for the efficient, safe and economical use of gas is one of the urgent tasks of today. New technologies will allow for the automation of networks, effective control of high-pressure gas transmission systems, and the use of energy-saving methods.

1. Smart (intelligent) gas meters

Now ah high and enterprises smart gas meters are being introduced for Theirs Advantages :

- **Automatic calculation and information transmission** - internet or mobile real time information via alo qa sent ;

ISSN 3060-4567

- **Real consumption control** - **illegal** connection or detecting deviations;
- **Without operators service show** - students needed not .

➞ This system human mistakes reduces and creates accuracy in calculation .

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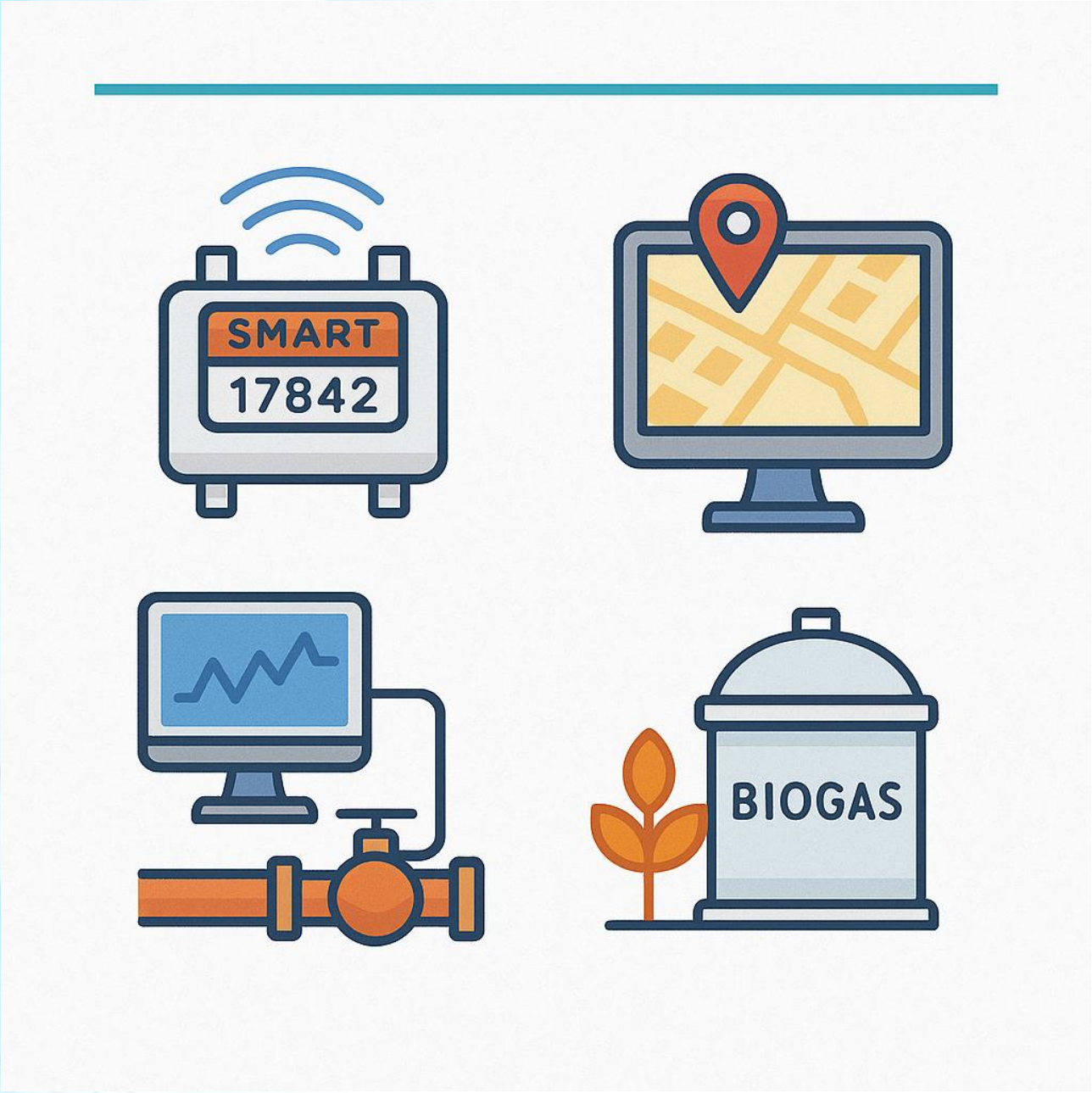
2. GIS technologies (Geographic Information System)

By managing gas networks based on an electronic map:

- Gas pipes, valves , points and complete digitization of network nodes ;
- Rapid detection of emergencies ;
- Preventive work effective opportunity to organize will be created .

➞ This method to monitor long- distance pipelines makes it easier .

ISSN 3060-4567



3. SCADA system (Supervisory Control and Data Acquisition)

SCADA – gas supply objects centralized in case management system is considered . His main tasks :

- Gas pressure and control the flow in real time ;
- Forecasting future situations;
- For engineers Early warning of dangerous situations .

➞ SCADA systems major cities and industry in the facilities wide is being introduced .

4. Detection of losses and energy efficiency

ISSN 3060-4567

important problems in gas supply One is **losses in pipes** . Through new technologies :

- Gas leak **acoustic sensors** to determine with ;
- Drone and visual through infrared cameras observation ;
- Gas flow automatically in order builder valves .

➞ This methods security increases and economic damages reduces .

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5. Biogas and artificial methane technologies

New trend – **renewable** gas production from **sources** :

- From agricultural waste, sewage **biogas** to take ;
- Using electrolysis artificial methane production (Power-to-Gas technology).

➞ This technologies environment for safe and is economically efficient in the long run .

Direction technical information on

Types of gas pipelines and characteristics

Types	**Material**	**Work pressure (bar)**	**Field of use**
Main pipes	Steel	1.2 – 7.5	Long distance transportation
Branch pipes	Polyethylene (PE-80/100)	0.005 – 0.6	Locally and within the city
Indoor pipes	Metal, plastic	0.001 – 0.005	In homes

➞ *Polyethylene pipes are highly rustproof and easy installation features with separated It stands .*

ISSN 3060-4567

capabilities of smart gas meters

Parameter	Value
Calculation accuracy	1–2% error level
Information transmission	GSM, NB-IoT , LoRaWAN
Energy supply	Lithium battery, service life 5–10 years
Sensor functions	Siznish , shock , illegal connection , cleanliness

Management through SCADA and GIS systems

- **SCADA :** Monitors gas pressure , temperature , and flow in real time . Provides remote control .
- **GIS :** Digital mapping of gas networks placing , technical service to show makes it easier .

4. Biogas production systems

Component	Description
Substrate sources	Organic waste, livestock waste, sewage
Operating temperature	35–55°C (mesophilic /thermophilic regimes)
Methane emission rate	50–70% (organic matter type related
Leftover product	Organic dog food as used

Chart recommendations

1. **Gas supply of the system structure** → Gas source → MGP (main) → RP (regulator point) → Network → Consumer
2. **SCADA system operating cycle** → Sensors → Controller → SCADA Center → Operator Monitor
3. **Biogas production process** → Substrate → Anaerobic **fermenter** → Gas separator → Methane reservoir

ISSN 3060-4567

4. **Smart meters information flow diagram** → Gas measurement → Information collection → Sending via modem → Provider → Subscriber

Recommendation to be done sources

Source name	**Content type**	**Source**
Gazprom Tech . recommendations	Regulations and technical standards	gazprom.ru
ASHRAE & IGU Guidelines	International standards	ashrae.org
Articles from Scopus / ScienceDirect	Scientific articles	sciencedirect.com
Uzbekistan Ministry of Energy of the Republic	National standards and reports	minenergy.uz
International Gas Union (IGU) reports	Statistics and innovations	igu.org

Conclusion

New developments in the gas supply sector through technologies :

- Digitization of networks and automation ;
- Security level increase ;
- Rational use of energy resources is provided .

Each in the future smart gas meters in the apartment , safe sensors and ecological to clean energy sources connected gas systems to be can This is not only economic efficiency , but also sustainable development is an important step for

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