



## CASE STUDY

### Beijing Gas: Tackling methane emissions in cities

Beijing Gas is developing a methane emissions governance system. This includes setting up reduction targets and a monitoring system as well as implementing measures to reduce methane leaks and vented volumes. This case study highlights explores how Beijing Gas is taking a comprehensive approach to methane abatement in urban transmission and distribution networks.

#### Context

Beijing Gas has an extensive gas transmission and distribution system with five rings, six pressure levels and seven direction. Several gas pipelines have been buried underground for a long time and are vulnerable to damages from soil corrosion, stray current corrosion (caused by subway cables, high-speed railways, telecommunication lines, etc.), third-party damage or natural disasters. The quality of pipes, welding and operating conditions, and construction patterns can also affect the integrity of pipelines.

To ensure safety and reduce emissions, Beijing Gas formulated methane emission control targets in its 14th Five-year Plan: lowering the methane emission intensity of its operational facilities in Beijing to below 0.12% by 2025, and strive to reach near zero emissions by 2030. Based on this framework and annual emissions monitoring, the company defines its annual methane emissions control plan and pursues established targets.

## Monitoring emissions

Methane sources from assets and operations are identified and classified in view of production processes, equipment characteristics and potential means of monitoring. These are linked to quantification methods, such as engineering estimates, emission factors or comprehensive measurements. These methods are subject to updates and data quality management plans, which consider each parameter involved in the process, with relevant departments and personnel taking care of data sampling, monitoring, analysis and recording to ensure the integrity and accuracy of data.

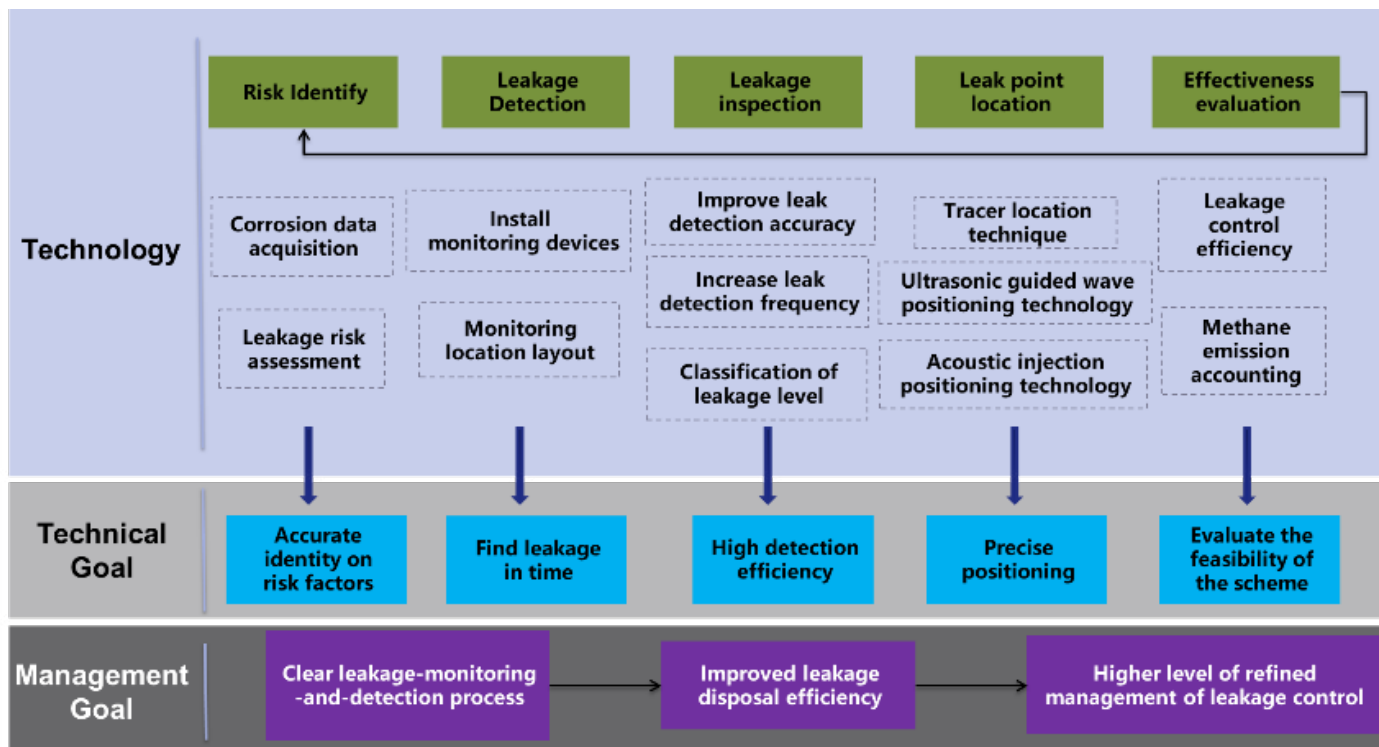
Beijing Gas actively carries out measurements for every section of the urban gas transmission and distribution system, including component-level detection for city gate stations, metering & regulating stations and CNG/LNG filling stations. These are based on optical gas imaging, flame ionization detectors, ultrasonic imaging and other detection technologies based on [EPA Method 21](#). Beijing Gas also monitors buried urban gas pipelines with multiple pressure levels using a combination of vehicle-mounted laser detection and manual trolleys, assessing the methane emissions profile of the urban gas transmission and distribution system.

## Reducing emissions

Beijing Gas has incorporated methane emissions control in its production and operations system, developing matching rules and regulations, including an organizational structure, working processes and data quality control. It also tracks domestic and foreign methane policies and the latest industry trends, carrying out research on detection and measurement technology, methane abatement measures, digital control systems and related topics. Further, an internal training system on methane abatement was set up to improve the capacity and skills of employees, with monthly lectures and science and technology forums.

To tackle leaks in complex gas networks in megacities, Beijing Gas has established a leak management and control system that employs five strategies: risk identification; leak detection; leak monitoring; leak positioning; and repair evaluation. By using different detection methods to complement each other's advantages, the system realizes an all-around and high-frequency leakage detection of the gas network.

## Urban gas pipeline leakage management and control system



Source: Beijing Gas

Continuous monitoring of cathodic protection status and stray current interference helps assess corrosion risks. Based on this, preventive measures are taken to avoid potential leaks. Beijing Gas also monitors equipment pressure levels' in gate wells, which, coupled with other operational data, provides guidances to maintenance work and leak detection. Moreover, vehicle-mounted high-sensitivity laser detection equipment is used to carry out full-coverage rapid inspections; and traditional trolleys are used for full-coverage inspections of gas pipelines twice a year. This helps to accurately pinpoint leaks, which minimises excavation area and emergency response time. Generally, pipeline leaks can be found within 24 hours after detection by traditional drilling methods.

When a high-risk leak is detected, pipeline repair needs to be timely. In order to reduce methane venting during maintenance and repair of city gas pipelines, Beijing Gas uses mechanical plugging equipment to avoid depressurization and methane emissions during repairs. Compared with manual operations, mechanical plugging coupled with

plunger-type occluders can avoid large-scale depressurization, reduce input of emergency-repair workers, and enable leak repair through the Cured-in-Place Pipe (CIPP) method. For areas where plugging can only be realized manually, the company installs temporary pipelines or temporary pressure regulating skids to remove the natural gas before the pipelines are vented.

These techniques generate considerable economic and environmental benefits. For example, the cost of replacing a single obsolete pressure regulating box can be reduced by nearly 70,000 RMB. In 2020 alone, the Fifth Branch Company saved over 9 million RMB by using new plugging equipment to maintain and repair pressure regulating stations/box and gas gate shafts within areas under its management. The mechanical plugging operation increases safety standards, reduces occupation of urban space and cuts maintenance costs for regulating equipment and facilities. It also reduces environmental pollution caused by the dust from excavation of operation pits.

### Enhancing international and domestic cooperation

Reducing methane emissions is not only an urgent in light of development strategies such as the green and low-carbon development strategy in China, but also a key link for realizing the low carbon and emission control targets in the 14th Five-year Plan of Beijing Gas. It also brings other benefits: a safer operation of urban gas companies, an efficient use of resources and a step towards carbon neutral cities.

In 2018, Beijing Gas became the first Asian oil and gas company to join the Methane Guiding Principles (MGP). Since then, it has advanced international best-practice, completed the Chinese translation of MGP's [Best Practice Guides](#), and partnered with international environmental organizations such as [UNEP](#) and the [Environmental Defense Fund](#). The company is also devoted to raise the awareness of methane emissions control within the Chinese industry. The group launched the China Oil and Gas Methane Alliance (COGMA) along with other companies and supported 10 other urban gas companies to collectively sign the Chinese Urban Gas Company Methane Emissions Control Initiative in 2021, a step towards better methane control in urban gas enterprises.