

GIS IN ACTION

ArcGIS Empowering Bengal Gas Company Limited's City Gas Distribution Network in Kolkata

Client

Bengal Gas Company Limited

Industry

Utilities - City Gas Distribution (CGD)

Organization Profile

Bengal Gas Company Limited is a leading natural gas distribution company serving industrial, commercial, and residential customers across Kolkata and surrounding regions. It is a joint venture of GAIL and Greater Calcutta Gas Supply Corporation Limited. The company develops and operates City Gas Distribution (CGD) networks, including steel and MDPE pipelines, pressure regulating stations, and CNG stations. BGCL is committed to providing safe, reliable, and clean energy solutions across the region.

Project

Integrated GIS Enterprise and Cloud-Based CGD Asset Management System

Website

www.bgcl.co.in

Project Summary

Bengal Gas Company Limited implemented an enterprise GIS solution using ArcGIS technology to modernize the management of its City Gas Distribution (CGD) assets. All assets are maintained digitally and securely stored in a cloud-based system. The solution migrated legacy GIS data and disconnected departmental workflows into a centralized cloud-based platform.

The new GIS system integrates spatial and non-spatial information related to pipelines, valve chambers, regulator stations, cathodic protection systems, PNG and CNG customers, and maintenance activities over the Kolkata GA Area.

The implementation provides a unified environment for planning, monitoring, analysing, and maintaining the entire gas network, enabling seamless collaboration across departments such as Engineering, Operations, Safety, and Customer Service.

Challenges

Before implementing its modern GIS platform, Bengal Gas Company Limited faced several key challenges, including fragmented asset data across multiple departments, limited scalability of its on-premises infrastructure, poor integration with enterprise systems, slow manual data updates, high maintenance costs, and a lack of real-time field access to critical asset information. These limitations affected data accuracy, operational efficiency, and decision-making across the organization.

Fragmented Asset Data - Infrastructure data was stored across multiple departments, leading to duplication and inconsistencies.

Limited Scalability - The on-premises GIS system struggled to support growing asset volumes and user demands.

Poor System Integration - Limited connectivity with other applications and internal systems, restricting seamless data exchange and reducing operational efficiency.

Manual Data Updates - Slow update processes reduced the accuracy and reliability of asset information.

High Maintenance Costs - Legacy infrastructure required significant investment in hardware and support.

Limited Field Access - Field teams lacked real-time access to critical asset data.

These challenges impacted data quality, operational efficiency, and decision-making across Bengal Gas Company Limited.

Solution

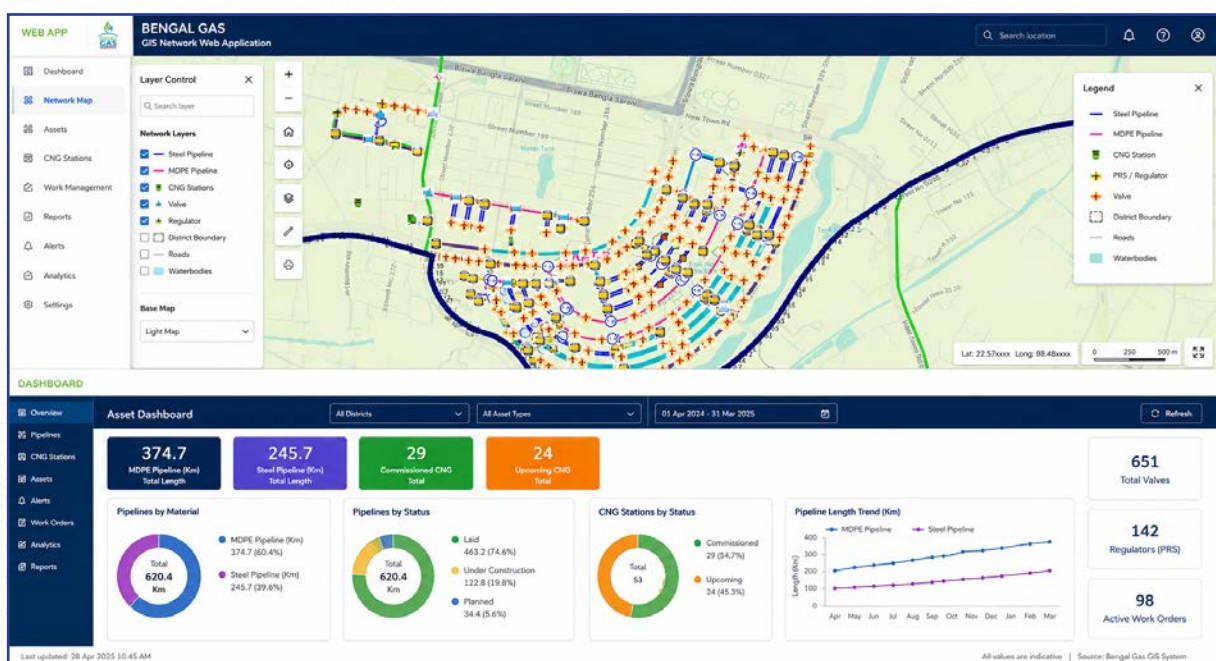
To modernize its asset management and operational workflows, Bengal Gas Company Limited implemented a comprehensive GIS solution powered by ArcGIS Enterprise. Designed to be secure, scalable, and fully integrated, the platform serves as a centralized digital foundation for managing the company's

City Gas Distribution (CGD) network and associated business processes.

At the core of the solution is a centralized enterprise geodatabase that consolidates all CGD assets and related operational information into a single source of truth. Interactive Web GIS applications enable users to visualize, query, and analyse pipelines, customer connections, and critical network infrastructure through an intuitive browser-based interface. Field operations are streamlined through ArcGIS Field Maps, which allows engineers and technicians to collect and update asset information, inspections, and maintenance records directly from the field using mobile devices.

For operational oversight, ArcGIS Dashboards provides a real-time view of key performance indicators, including pipeline length by material and pressure category, CNG station count, active PNG and CNG customers, domestic PNG installation statistics, inspection status, leakage reports, and work order progress. These dashboards transform complex spatial and operational data into actionable insights for management and technical teams.

The platform is also designed to integrate seamlessly with BGCL's internal applications and business systems, enabling efficient data exchange and a unified view of operational information. This connected environment enhances cross-functional collaboration, improves data consistency, and supports faster, more informed decision-making across the organization.



Web Application

Benefits

The implementation of the ArcGIS Enterprise solution has delivered substantial operational and strategic benefits to Bengal Gas Company Limited, transforming the management of its City Gas Distribution (CGD) network.

Centralized Enterprise GIS Platform

A secure, centralized geodatabase serves as a single source of truth for all CGD assets and related operational information.

Interactive Web GIS Applications

Browser-based applications enable users to visualize, query, and analyse pipelines, customer connections, and other critical assets from anywhere within the organization.

Mobile GIS for Field Operations

ArcGIS Field Maps empowers field teams to collect and update asset information, inspections, and maintenance records directly from site locations.

Real-Time Operational Dashboards

ArcGIS Dashboards provides dynamic insights into key performance indicators such as pipeline length, CNG station count, customer connections, inspection status, and work order progress.

Enhanced Operational Efficiency

Automated workflows reduce manual effort and significantly improve data turnaround times.

Improved Data Accuracy

Standardized data capture and centralized asset management minimize duplication and ensure reliable information.

Faster Decision-Making

Real-time access to spatial and operational data supports timely and informed management decisions.

Increased Field Productivity

Mobile access to current asset information streamlines inspections, maintenance, and reporting activities.

Scalable and Future-Ready Architecture

The platform is designed to support network expansion, additional users, and evolving business requirements.

Cost Optimization

Reduced infrastructure and maintenance costs through the adoption of a modern enterprise GIS platform.

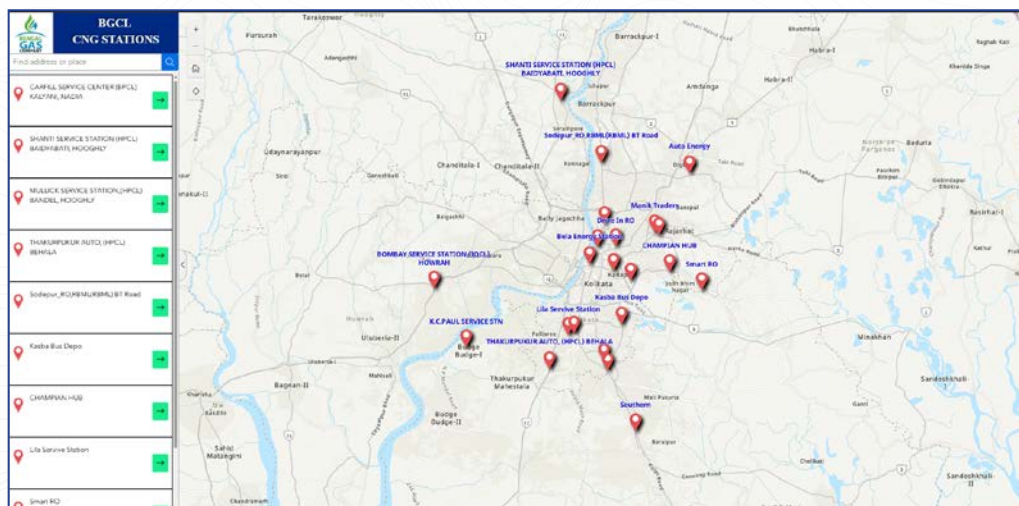
Improved Collaboration

A unified system strengthens coordination by ensuring all departments work from the same authoritative data source.

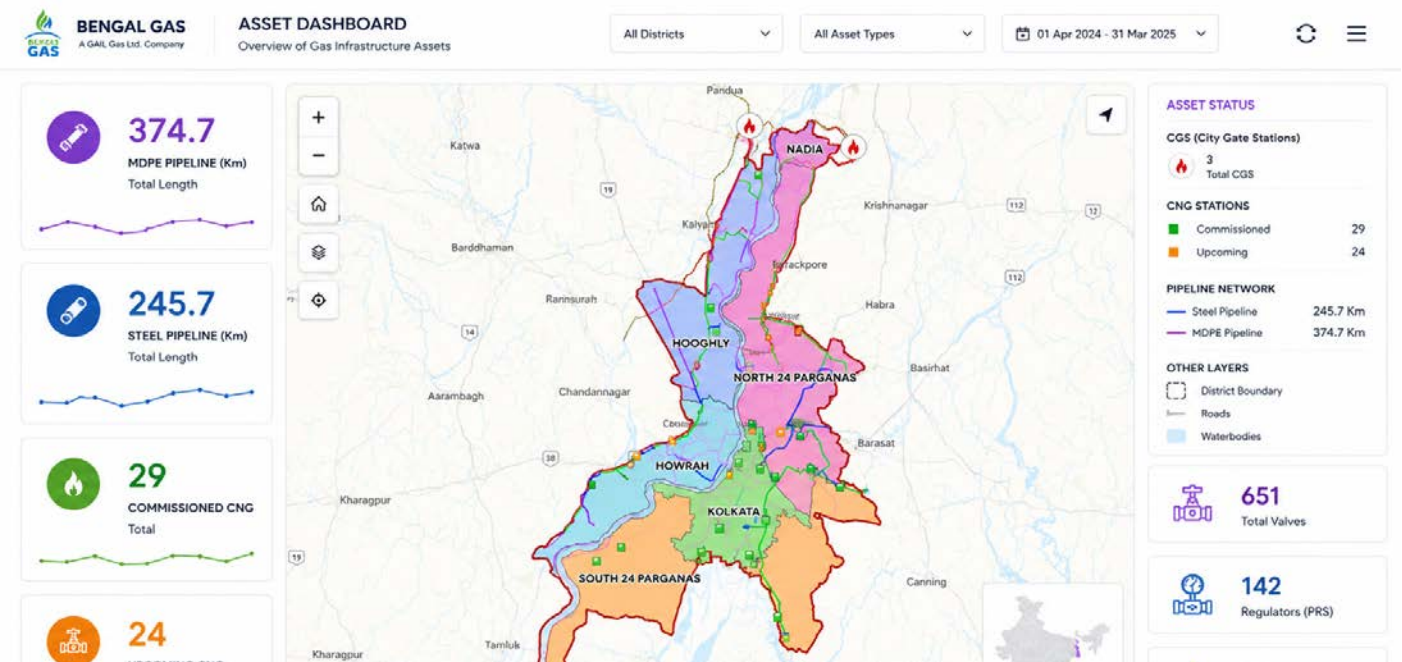
Regulatory Compliance

Accurate asset records and inspection histories support compliance with Petroleum and Natural Gas Regulatory Board (PNGRB) regulations.

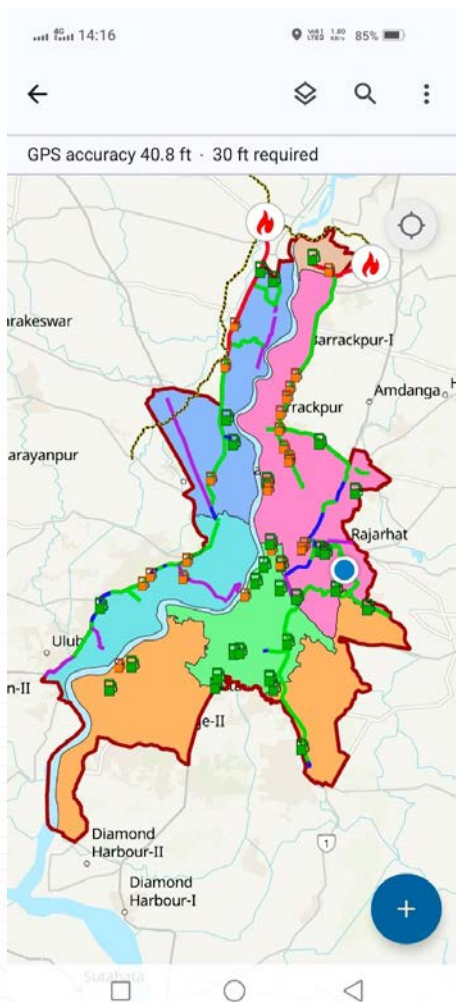
Collectively, these benefits have enhanced operational visibility, strengthened governance, and positioned BGCL to deliver safe, reliable, and sustainable energy services across Kolkata GA.



CNG Stations



Asset Dashboard

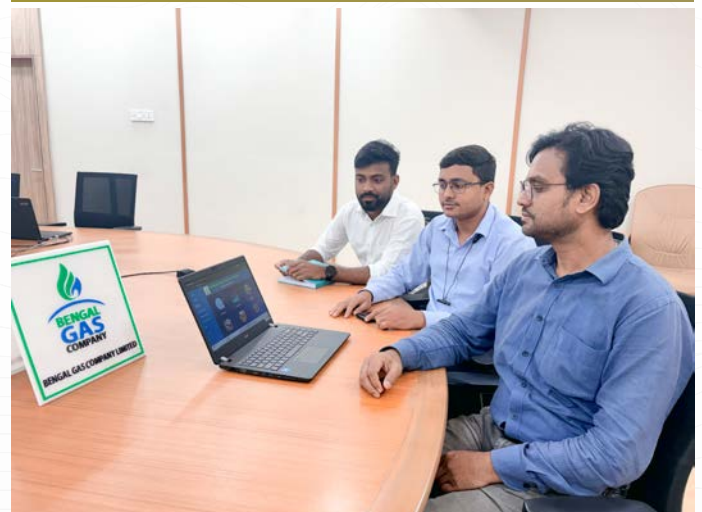


Field Map



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“The implementation of the ArcGIS Enterprise solution has enabled the management of Bengal Gas Company Limited's City Gas Distribution (CGD) network in Kolkata, delivering substantial operational efficiencies, enhanced decision-making capabilities, and long-term strategic value.” - Shri Anupam Mukhopadhyay, CEO, Bengal Gas Company Limited



USAC: Enabling Smarter Governance Through GIS



Governance today requires timely information, informed decision-making, and seamless coordination across departments. Geographic Information System (GIS) has emerged as a powerful enabler, helping governments integrate diverse datasets, visualize complex challenges, and deliver citizen-centric services more effectively. At the **Uttarakhand Space Application Centre (USAC)**, GIS is playing a pivotal role in supporting planning, resource management, disaster preparedness, and digital governance across the state. In this interaction, **Prof. Durgesh Pant, Director, USAC**, shares how geospatial technology is transforming governance in Uttarakhand, the impact it has created over traditional systems, and the value of collaborating with Esri India to build innovative, location-driven solutions.

What are the core functions of USAC?

USAC was established to address the state's growing need for space technology and geospatial applications. Our primary objective is to provide technology-driven solutions to various government departments using satellite imagery, GIS, and other space-based technologies.

How are you using GIS in your work?

GIS has become the foundation of many of our initiatives. Geospatial information is relevant across virtually every sector, from agriculture and land use to urban planning,

water resources, disaster management, and forestry. GIS has become an integral part of the decision-making processes of the government departments. Today, USAC works closely with these departments to develop innovative applications that solve real-world challenges and support better governance.

One of our significant projects focuses on managing government assets and addressing encroachment issues. We have also created an integrated GIS dashboard for one of Uttarakhand's border districts, bringing together nearly 200 data layers on a single platform. We are now developing a similar dashboard for Rudraprayag district, home to the Kedarnath Temple.

We look forward to building GIS-based dashboards for every district in Uttarakhand, enabling administrators, policymakers, and citizens to access reliable, location-based information for informed decision-making and improved public service delivery.

What benefits have you observed in using GIS over traditional systems?

Earlier, most government departments relied on manual processes or basic spreadsheet-based systems. GIS has completely transformed how information is managed and analyzed.

Today, we can accurately locate settlements, link them with multiple attributes, visualize relationships between datasets, and perform complex spatial queries that were previously impossible. This has significantly improved planning, monitoring, and decision-making across departments.

Instead of working with isolated datasets, GIS provides an integrated view of information, helping stakeholders understand patterns, identify issues quickly, and implement more effective solutions.

We appreciate Esri India's commitment to bringing advanced GIS capabilities to users and enabling organizations like ours to build impactful applications. We look forward to strengthening our collaboration and exploring new opportunities to leverage geospatial technology for better governance and public service.

Suez International: Building Smarter Water Utilities with GIS and AI



As cities around the world strive to build more resilient and sustainable water infrastructure, digital technologies such as Geographic Information Systems (GIS) and Artificial Intelligence (AI) are transforming the way utilities manage their assets and deliver essential services. In this conversation, **Dr. Sandeep Mahajan, Asset Manager at Suez International**, shares how GIS has become the backbone of large-scale water and wastewater projects, enabling smarter planning, efficient asset management, and data-driven decision-making. He also discusses the growing role of AI in predictive maintenance and how its integration with GIS can help utilities improve operational efficiency and proactively manage critical infrastructure.

How important is the use of GIS in the utilities industry?

GIS is an invaluable tool for creating, collecting, managing, and analyzing geographically referenced data. It brings together infrastructure, terrain, population, and environmental information on a single platform, enabling utilities to make informed decisions based on location intelligence.

How does GIS support wastewater and stormwater management?

In wastewater and stormwater management, GIS provides a comprehensive understanding of infrastructure, its

condition, terrain, and population. Since population directly influences wastewater generation, having all this information in one system allows utilities to plan future infrastructure, optimize operations, and improve service delivery.

How has Suez International leveraged GIS in its projects?

We have been using Esri's ArcGIS platform since I joined Suez International in 2012. For large city-wide water distribution projects involving more than 1,000 kilometers of pipeline networks and thousands of customer connections, GIS serves as the foundation for mapping and managing assets.

Beyond mapping, how does GIS add value to your operations?

GIS is much more than a mapping tool. We use it for spatial analysis, asset management, planning, and operational decision-making. Any environmental or utility service that depends on accurate, location-based information can benefit significantly from GIS.

How do you see AI enhancing asset management?

AI has tremendous potential to improve asset management. For example, if AI can analyze photographs or visual inspection data to assess the condition of infrastructure, it could quickly identify deterioration or potential failures without relying solely on manual inspections or physical sampling.

What excites you most about combining AI with GIS?

The combination of AI and GIS can make asset management far more proactive. By integrating image analysis with historical asset data and GIS, utilities can implement predictive maintenance, prioritize investments, reduce downtime, and improve the reliability and longevity of water and wastewater infrastructure.



Ashoka University: Empowering the Next Generation of Spatial Thinkers

As the world becomes increasingly data-driven, the ability to understand, analyze, and interpret spatial information has emerged as a critical skill across disciplines. Geographic Information Systems (GIS) is no longer confined to geography or urban planning; it is now shaping research and decision-making in environmental science, economics, public policy, archaeology, public health, business, and the humanities. Universities across the globe are responding by embedding GIS into their academic curricula, ensuring that students graduate with the analytical capabilities needed to solve complex, real-world challenges.

GIS education goes beyond teaching students how to create maps. It equips them with the ability to integrate diverse datasets, visualize patterns, uncover relationships, and generate actionable insights. In an era where Artificial Intelligence, remote sensing, satellite imagery, and big data are transforming every sector, GIS provides the essential spatial context that helps students connect information with place, people, and processes.

Among the institutions leading this interdisciplinary approach in India is **Ashoka University**, where GIS has evolved into a powerful academic and research tool that transcends traditional disciplinary boundaries.

Fostering GIS Education Across Disciplines

By making GIS accessible to students from diverse academic backgrounds, Ashoka University is preparing graduates who can leverage spatial intelligence to address some of society's most pressing challenges. GIS is integrated into teaching, research, and social impact initiatives rather than being limited to a standalone technical subject.

As mentioned by **Meghna Agarwala, Ph.D., Associate Professor, Department of Environmental Studies, Ashoka University**, courses on GIS and remote sensing are open to students from all majors, reflecting the university's philosophy of interdisciplinary education. Beyond dedicated GIS courses, spatial technologies are embedded into subjects such as earth systems, air pollution, and environmental modelling, enabling students to apply geospatial thinking within broader scientific investigations.

Students from humanities disciplines, including English, Archaeology, History, and Philosophy, are increasingly applying GIS for digital humanities projects. **Spatial analysis enables them to study historical landscapes, map archaeological sites, examine cultural heritage, and visualize historical narratives in entirely new**

ways. Many of these projects go on to become integral components of doctoral research.

Economics students incorporate geospatial datasets into econometric analyses, allowing them to better understand regional development, demographic trends, environmental influences, and socio-economic disparities. **By combining spatial data with statistical models, they gain deeper insights into policy and economic questions.**

For students in the **natural sciences, GIS often forms the foundation of research, capstone projects, and thesis work.** Spatial analysis supports investigations in environmental science, ecology, climate studies, biodiversity, and earth systems, helping students model complex natural processes and interpret environmental change.

In addition to courses for undergraduates, the university also offers GIS to students of the Young India Fellowship and to social practitioners through the Professional Education and Development Programme.

This interdisciplinary approach demonstrates how GIS can enrich learning across the sciences, social sciences, economics, and the humanities while fostering innovation, research excellence, and societal impact.

As governments, businesses, and research institutions increasingly adopt GIS, GeoAI, digital twins, and location intelligence, the demand for graduates with spatial thinking skills continues to grow rapidly. Universities have a crucial role to play in preparing this workforce by integrating GIS into mainstream and fostering a culture of using **GIS to Innovate. Integrate and Inspire.**

