

# **Track 1: AI for Urban Resilience**

## **Case Study**

Delhi's infrastructure operates under constant, extreme pressure. During the peak summer months, a city-wide heatwave can cause energy demand to skyrocket by over 40% as millions of air conditioners switch on simultaneously. This surge not only strains the power grid, risking blackouts in vulnerable areas, but it also places immense demand on the water system, as pumping stations work overtime to supply a parched city. An unexpected grid failure in a key sector can knock out water supply for thousands, creating a cascading crisis. Conversely, an erratic monsoon can lead to flash floods, overwhelming drainage systems while simultaneously threatening the electrical substations that power them. The city's energy and water networks are **deeply interconnected**, yet they are managed in silos. Current systems are reactive, addressing blackouts and pipe bursts only after they happen, leading to massive inefficiencies and service disruptions that disproportionately affect the city's most vulnerable residents.

## **Call for Innovation**

We are calling for a paradigm shift from reactive maintenance to **proactive, predictive resilience**. We challenge you to build the AI-powered "nervous system" for the city's critical infrastructure. We need intelligent systems that can forecast demand, anticipate failures, and optimize resource allocation in real time. The goal is to move beyond simple monitoring and create solutions that provide **actionable intelligence** to city planners, utility operators, and citizens. We're looking for innovations that can analyze complex datasets—weather forecasts, historical consumption patterns, social media event trends, and sensor data—to keep Delhi's lights on and its water flowing, no matter the stress.

## **Problem Statements**

### **1. The Predictive Grid Overload Forecaster**

The Delhi Transco Ltd. needs to anticipate and manage demand spikes to prevent grid collapse during extreme weather. Your challenge is to build a **high-fidelity energy demand forecasting model**. Using historical hourly consumption data, weather forecasts (temperature, humidity, solar radiation), and a calendar of public holidays and major city events, your AI must predict energy demand for the next 48 hours with pinpoint accuracy at a zonal level.

### **2. The Intelligent Water Network Guardian**

The Delhi Jal Board loses nearly 40% of its water to leakages and unauthorized siphoning. Your task is to design an AI system that acts as a guardian for the city's water pipelines. Using simulated real-time data from flow, pressure, and acoustic sensors across a water network, your model must **detect and pinpoint the location of leaks**.

### 3. The Integrated Resilience Command Center

City officials lack a unified view of how a failure in one system impacts another. Your challenge is to build a command center dashboard that models the **cascading failures** between Delhi's power and water grids. Your platform should allow users to simulate a crisis—for instance, "a 3-hour power outage at a major substation during a 45°C day"—and visualize its immediate and secondary impacts.