Project Design Phase

Solution Architecture

Date	14 June 2025
Team ID	LTVIP2025TMID60699
Project Name	Sustainable Smart City Assistant Using IBM Granite LLM
Maximum Marks	4 Marks

Solution Architecture – Sustainable Smart City Assistant

Our solution architecture bridges real-world sustainability challenges with a practical, tech-based platform. It brings together multiple tools and technologies to create one smooth user experience.

Key Goals:

- **Use the best tech to solve real urban sustainability problems.**
- **Clearly define how each part of the system works together.**
- **Outline what features are needed and how they are delivered in stages.**
- **Ensure the app is reliable, maintainable, and scalable for future use.**

Architecture Overview:

1. **Frontend (User Interface)**
    - **Built with React (or any modern web framework)**
    - **Theme-based, responsive UI**
    - **Supports dashboards, charts, chat, eco tips, and summaries**
    - **Offline and multilingual support**
2. **Backend (Processing & Data Handling)**
    - **APIs for real-time environmental data (AQI, water, energy, traffic)**
    - **Forecasting and anomaly detection modules using ML models**
    - **Custom logic for smart alerts, eco tips, and summarization**

- **Handles user preferences and personalization**

3. **Data Layer**
    - **External APIs for live city/environmental data**
    - **Local JSON or database for storing user preferences, settings, tips**
    - **Data preprocessing for forecasts and summaries**
4. **AI/ML Components**
    - **Forecasting: Predict trends in air quality, water usage, etc.**
    - **Anomaly Detection: Identify sudden spikes or abnormal patterns**
    - **Chat Assistant: Natural language interface to help users**
    - **Summarizer: Converts raw city data into understandable insights**
5. **Smart Features Layer**
    - **Smart alerts based on user behavior, thresholds, and city conditions**
    - **Personalized eco tips based on location, habits, and recent data**
    - **Multilingual interface and theme-switching capability**

Development Phases:

- **Phase 1: Dashboard + APIs + UI setup**
- **Phase 2: Forecasting + Anomaly Detection + Eco Tips**
- **Phase 3: Chat Assistant + Summarizer + Smart Alerts**
- **Phase 4: Polishing UX, offline mode.**

Example - Solution Architecture Diagram:

Smart City Assistant