Technology Stack (Architecture & Stack)

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Team ID: LTVIP2025TMID20299

Project Name: Sustainable Smart City Assistant Using IBM Granite LLM

Maximum Marks: 2 Marks

Table-1: Components & Technologies

S.No	Component	Description	Technology
1	User Interface	Web-based interface for policy, KPI, chat, feedback modules	Streamlit (Python)
2	Application Logic-1	Handles summarization, forecasting, anomaly detection, eco tips, chat	Python (modular function-based)
3	Application Logic-2	Manages AI prompt creation and Watsonx response parsing	IBM Watsonx Granite LLM
4	Database	Session-based temporary storage	Streamlit session_state
5	Cloud Database	Future scope for feedback/data persistence	Planned: IBM Cloudant or Firebase

6	File Storage	Stores .env credentials, sample PDFs, and CSVs	Local filesystem
7	External API-1	Access to foundation model for all generative tasks	IBM Watsonx Model API
8	External API-2	Future integration with document search	Planned: Pinecone, GitHub API
9	Machine Learning Model	Generates summaries, predictions, tips, and chat	IBM Granite-3B / Granite-13B Instruct
10	Infrastructure	Runs locally with optional cloud deployment	Streamlit Cloud / IBM Cloud

Table-2: Application Characteristics

S.No	Characteristics	Description / Technology
1	Open-Source Frameworks	Built using Python, Streamlit, PyMuPDF, pandas
2	Security Implementations	API key handling with python-dotenv and secured .env file

3	Scalable Architecture	Modular, prompt-driven backend, extendable with additional ML/LLM modules
4	Availability	Supports local use, deployable on Streamlit Cloud or IBM Cloud
5	Performance	Fast response using optimized prompting and minimal frontend latency