**Project Design Phase**

**Problem – Solution Fit Template**

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| Date | 28 JUNE 2025 |
| Team ID | LTVIP2025TMID34374 |
| Project Name | Sustainable smart city assistant using IBM granite LLM |
| Maximum Marks | 2 Marks |

Sustainable smart city assistant using IBM granite LLM **Template:**

**Smart City Assistant (IBM Granite LLM)**

**1. Customer Problems / Pain Points**

* Residents don’t get timely alerts about **air quality**, **traffic congestion**, or **waste pickup delays**.
* City planners struggle to access **integrated data** across traffic, energy, and environment systems.
* Communication with city authorities is **manual**, slow, and inefficient.
* Lack of **personalized sustainability recommendations** (e.g., how residents can reduce energy use).
* Complexity of **understanding RAG-based data narratives**: insights may be lost or misunderstood.

**2. Existing Customer Behavior & Mediums**

* Citizens monitor local alerts via **social media, municipal apps, SMS**.
* Planners use **dashboard interfaces**, spreadsheets, and periodic reports.
* Public feedback through **helpdesk calls**, emails, or in-person visits.

**3. Proposed Solution**

A conversational, intelligent assistant that:

* Integrates with real‑time **IoT feeds** (traffic, AQI, energy, waste).
* Processes multimodal data (text + images) via **Granite Vision**.
* Uses **chain-of-thought reasoning** to generate structured explanations [lablab.ai+8linkedin.com+8github.com+8](https://www.linkedin.com/posts/prramhod_ibm-granite-31-powerful-performance-longer-activity-7275407596163903489-w8m8?utm_source=chatgpt.com)[community.ibm.com+1forbes.com+1](https://community.ibm.com/community/user/blogs/yash-sawlani/2025/01/02/protecting-rag-and-ai-apps?utm_source=chatgpt.com)[forbes.com+2ibm.com+2ibm.com+2](https://www.ibm.com/think/tutorials/llm-chain-of-thought-reasoning-granite?utm_source=chatgpt.com).
* Delivers personalized insights, alerts, and sustainability suggestions to both citizens and decision-makers.
* Embeds directly into existing channels (SMS, WhatsApp, web, municipal apps).

**4. Value Propositions & Triggers**

* **Timely alerts**: “AQI just spiked in your area—here’s how to protect your family.”
* **Actionable insights**: “Your energy use is 15% above average—reduce usage by switching to LED.”
* **Data-driven decision support**: “Forecast shows peak traffic at 5 PM; deploy additional buses.”
* **Trust-building**: Transparent logic with chain-of-thought explanations; built-in **Granite Guardian** safeguards [community.ibm.com+1linkedin.com+1](https://community.ibm.com/community/user/blogs/yash-sawlani/2025/01/02/protecting-rag-and-ai-apps?utm_source=chatgpt.com).
* **Instant access**: No waiting for monthly reports—citizens and officials get info in natural language, anytime.

**5. Channels & Touchpoints**

* Chat interfaces on **web portal**, **WhatsApp**, **SMS**, **city apps**.
* Embedded **dashboard widgets** with narrative overviews.
* Periodic **forecast emails** using RAG-generated summaries.

**6. Key Metrics / Success Criteria**

* **Engagement**: # of activated alerts and threads resolved via chat.
* **Insight Accuracy**: Alignment of RAG outputs with actual sensor data (QA precision/recall).
* **User Satisfaction**: Citizen & planner ratings of clarity and utility.
* **Adoption Rate**: % of residents integrating assistant into daily routines.
* **Behavior Change**: Reduction in energy use, traffic peak load smoothing, improved waste recycling metrics.

**7. Assumptions to Validate**

* Citizens will act on LLM-generated sustainability suggestions.
* Granite LLM can reliably interpret multimodal urban data (visuals, time-series).
* RAG pipeline provides up-to-date and accurate contextual responses .
* Existing channels (WhatsApp, municipal app) support chatbot integration.

**8. Next Steps**

* **Prototype** a chat AI using **Granite 3.3B** via Watsonx.ai [newsroom.ibm.com+10github.com+10linkedin.com+10](https://github.com/KanukaVinay/sustainable-smart-city-ai-assistant?utm_source=chatgpt.com).
* **User tests** with residents and city officials on real-time alerts and explanations.
* **Measure** usage, satisfaction, and behavioral indicators (e.g., energy savings).
* **Iterate** based on feedback: refine triggers, expand vision model training, improve RAG reliability.

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