
CAPSTONE PROJECT

SMART HOME ENERGY ADVISOR AGENT

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OUTLINE

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PROBLEM STATEMENT

Smart homes often generate massive data from smart meters and appliances, but homeowners struggle to make sense of their energy consumption. The challenge is to build a Smart Home Energy Advisor Agent that uses AI to analyze power usage, explain high bills, and suggest energy-saving actions in a simple, actionable way.

TECHNOLOGY USED

IBM cloud lite services

Natural Language Processing (NLP)

IBM Granite model

IBM CLOUD SERVICES USED

- IBM Cloud Watsonx AI Studio
- IBM Cloud Watsonx AI runtime
- IBM Cloud Agent Lab
- IBM Granite foundation model

WOW FACTORS

- Personalized insights based on real-time energy data
- AI explains complex data in everyday language
- Proactive alerts like "You can save ₹500/month by rescheduling appliance use"
- Visual graphs for appliance-specific usage
- Suggests optimal time slots for heavy appliances based on dynamic pricing

END USERS

- Homeowners with smart energy systems
- Utility providers (as a value-added service)
- Green energy startups and energy auditors

RESULTS

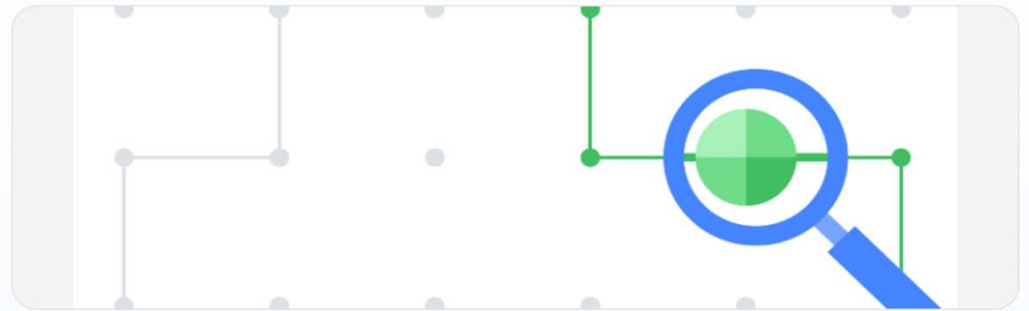
Agent preview



watsonx Agent 05:09 PM

Welcome to watsonx Agent

Change this description to reflect your particular agent



Type something...



RESULTS

Agent preview



You: 05:12 PM

ac tv refrigerator plot 500 square meter 2000 per month kanpur 3 star



watsonx Agent 05:12 PM

Based on the search results, it seems that there are several factors that could be contributing to your high energy bill this month. Here are a few possible reasons:

1. High usage of appliances: The search results suggest that you are using a 1.5 ton split AC, which is a high-energy appliance. Additionally, you mentioned that you have a refrigerator, TV, and other appliances in your 500 square meter house, which could be contributing to your high energy bill.
2. 3-star ratings: The search results mention that you have 3-star rated appliances, which are not as energy-efficient as 5-star rated appliances. This could be contributing to your high energy bill.
3. Location: Kanpur is a city in India, and the search results suggest that the cost of electricity in Kanpur is relatively high compared to other cities in India.

To reduce your energy bill, you could consider the following suggestions:

1. Run your washing machine during off-peak hours: The search results suggest that running your washing machine during off-peak hours can help you save money on your energy bill.
2. Use energy-efficient appliances: Consider replacing your 3-star rated appliances with 5-star rated appliances, which are more energy-efficient and can help you save money on your energy bill.

Type something...



RESULTS

Agent preview

► How did I get this answer?



You: 05:16 PM

help me to suggest how much i have to run appliances



watsonx Agent 05:16 PM

To suggest how much you should run your appliances to save money, I'll need to consider the following factors:

1. Appliance energy ratings
2. House size and type
3. Energy bill history
4. City and location
5. Device energy ratings

Based on the information you provided earlier, here are some suggestions:

1. AC:
 - Run the AC for 8 hours a day during peak summer months (April to June and September to November).
 - Set the temperature to 24°C (75°F) during the day and 26°C (79°F) at night.
 - Consider using a 5-star rated AC to save energy.

Type something...



RESULTS

Deployed AI Agent

The screenshot displays the IBM watsonx Agent web interface. The browser address bar shows the URL: `dataplatfom.cloud.ibm.com/ml-runtime/deployments/3c66448d-63d5-4152-816b-16acc7a3068b/chat?space_id=c1a03a1d-6d9c-49ee-92c6-621b01a79c5f&context=wx&flush=t...`. The interface includes a navigation bar with 'IBM watsonx', an 'Upgrade' button, and user account information for 'Aniket Mishra's Account' in 'Dallas'. The breadcrumb trail indicates the current location: 'Deployment spaces / Deployment / watsonx Agent /'. The main header shows 'watsonx Agent' with 'Deployed' and 'Online' status indicators. Below this are tabs for 'API reference', 'Test', and 'Preview', with 'Preview' being the active tab. A 'New chat +' button is located in the top right corner of the chat area. The chat history shows a user message at 08:01 PM: 'my city is kanpur and my electricity bill is 20000 per month my ac consumes 200 kw per day tv consumes 300 kw per day'. The watsonx Agent response, also at 08:01 PM, provides five suggestions to reduce electricity bills in Kanpur: 1. Use energy-efficient appliances, 2. Reduce AC usage, 3. Use power-saving modes, 4. Switch to solar power, and 5. Optimize home insulation. A text input field at the bottom contains the placeholder 'Type something...'. The Windows taskbar at the bottom shows the time as 20:08 on 02-08-2025, with system settings for 'ENG IN' and various icons.

Deployment spaces / Deployment / watsonx Agent /

watsonx Agent Deployed Online

API reference Test **Preview**

New chat +

You 08:01 PM
my city is kanpur and my electricity bill is 20000 per month my ac consumes 200 kw per day tv consumes 300 kw per day

watsonx Agent 08:01 PM
Based on the search results, here are some suggestions to reduce your electricity bill in Kanpur:

1. Use energy-efficient appliances: Look for appliances with high star ratings, which consume less energy. For example, you can consider replacing your old AC with a new one that has a higher star rating.
2. Reduce AC usage: Try to reduce your AC usage by using it only when necessary. You can also consider using fans or other cooling devices to reduce your reliance on AC.
3. Use power-saving modes: Many appliances, including TVs and ACs, have power-saving modes that can help reduce energy consumption. Make sure to use these modes whenever possible.
4. Switch to solar power: Consider installing solar panels to generate electricity and reduce your reliance on the grid. This can help you save money on your electricity bill and also reduce your carbon footprint.
5. Optimize your home's insulation: Proper insulation can help reduce heat gain in the summer and heat loss in the winter,

Type something...

CONCLUSION

- The Smart Home Energy Advisor Agent bridges the gap between energy data and user awareness. It empowers users with AI-driven insights, leading to smarter energy consumption and reduced bills—contributing to sustainability goals.

FUTURE SCOPE

- Integration with smart thermostats and solar panels
- Voice assistant support (e.g., Alexa, Google Home)
- Carbon footprint analysis and sustainability scoring
- Integration with utility billing systems for direct comparison and tracking

IBM CERTIFICATIONS



7/24/25, 6:57 PM

Completion Certificate | SkillsBuild

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Aniket Mishra

for the completion of

**Lab: Retrieval Augmented Generation with
LangChain**

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 24 Jul 2025 (GMT)

Learning hours: 20 mins

In recognition of the commitment to achieve
professional excellence



Aniket Mishra

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



Issued on: Jul 19, 2025

Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/6b09943a-71e8-45b1-9a83-b190ceb47bcf>



GITHUB LINK

- <https://github.com/aniketm0317>

THANK YOU