



WESTERN MICHIGAN UNIVERSITY

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Final Project Report

“Green Expectations LLC - Add AI Modules to Current Website”

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ABSTRACT

This project focuses on the development of a versatile chatbot for Green Expectations LLC's real estate website, aiming to guide users toward sustainable housing solutions. The chatbot provides eco-friendly responses, troubleshoots website-related issues, and assists users in estimating property values. Through collaboration and iterative adjustments, the team successfully integrated AI elements, including the AI Prompt Engine, ensuring personalized recommendations aligned with user preferences.

Thorough user experience testing and seamless integration into the existing website were prioritized to enhance the chatbot's functionality. The team addressed challenges related to AI alignment and user data privacy and collaborated with external experts to incorporate energy efficiency insights. Future enhancements include broader troubleshooting capabilities, continuous updates, and engagement strategies such as AI-generated blogs and affiliate marketing.

The project explores innovative concepts, such as virtual personal assistants and Phase 2 initiatives involving scraping sustainable housing data from multiple sources. By embracing a holistic approach, the chatbot not only provides technical solutions but also considers strategic elements, marking a significant step towards creating an interactive, user-centric, and sustainable real estate experience.

In addition to technical prowess, this project places a premium on strategic foresight. User engagement strategies, including AI-generated blogs and affiliate marketing, align with a vision to educate and empower users about sustainable living. The emphasis on user data privacy, documented in an advisory document, reflects a commitment to ethical AI practices.

Collaborations with external experts, plans for continuous improvement, and a focus on marketing and monetization underscore the project's dynamic nature. The exploration of virtual personal assistants and Phase 2 initiatives amplifies the commitment to staying at the forefront of innovation. By encapsulating technical innovation, user-centric strategies, and a commitment to sustainability, this chatbot project signifies a transformative step in redefining the real estate landscape, offering users a comprehensive, interactive, and forward-thinking platform for their housing needs.

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INTRODUCTION

The Green Expectations LLC Chatbot project emerges at the intersection of real estate and artificial intelligence, envisioning a transformative user experience. Recognizing the dynamic landscape of sustainable living, this initiative seeks to integrate an intelligent chatbot into the existing website framework, providing users with tailored guidance, troubleshooting support, and estimations for their properties.

1.1 Purpose:

The purpose of this project is twofold: firstly, to enhance user interactions on the Green Expectations LLC real estate website by implementing an intelligent chatbot capable of delivering eco-friendly responses and addressing user concerns effectively. Secondly, the project aims to empower users in their pursuit of sustainable living by incorporating AI-driven features, personalized recommendations, and collaborations with external experts, fostering a holistic approach to real estate engagement.

1.2 Scope:

The scope of this project spans the development and integration of a chatbot within the Green Expectations LLC website, focusing on sustainable living aspects. The chatbot will offer troubleshooting support, property estimation guidance, and personalized recommendations. The project also encompasses considerations for user data privacy, collaboration with external experts, and future enhancements, such as virtual personal assistants and Phase 2 initiatives, expanding the scope to encompass a dynamic and evolving real estate ecosystem.

OBJECTIVES AND DELIVERABLES

2.1 Objectives:

2.1.1 Develop a Functional Chatbot:

- Lead the design and development of the chatbot architecture.
- Integrate AI elements, including the AI Prompt Engine, for personalized recommendations.
- Implement troubleshooting features to address user issues effectively.

2.1.2 Enhance User Experience:

- Conduct user experience testing to refine the chatbot's functionality.
- Seamlessly integrate the chatbot into the existing Green Expectations LLC website.
- Gather and incorporate user feedback for iterative improvements.

2.1.3 Facilitate Property Estimations:

- Develop algorithms for property estimation guidance based on sustainable living criteria.
- Collaborate with real estate experts to ensure accurate and relevant estimations.
- Implement user-friendly interfaces for property estimation interactions.

2.1.4 Explore External Properties:

- Enable the chatbot to explore properties on external websites, providing users with a comprehensive view.
- Integrate external APIs and data sources to fetch diverse property information.
- Implement a user-friendly interface for buyers to navigate and explore external listings.

2.2 Deliverables:

2.2.1 Functional Chatbot:

- Develop and implement a fully functional chatbot capable of delivering sustainable housing advice, troubleshooting support, and property estimation guidance.
- Ensure the chatbot's compatibility with the Green Expectations LLC website.

2.2.2 Troubleshooting Assistance:

- Implement features addressing user issues, including login problems, navigation difficulties, and other website-related challenges.
- Provide users with a seamless troubleshooting experience through the chatbot interface.

2.2.3 Property Estimation Guidance:

- Integrate the chatbot to guide both buyers and sellers in estimating property values based on sustainability factors.
- Develop algorithms for accurate and transparent property estimations.

2.2.4 External Property Exploration:

- Enable the chatbot to explore properties on external websites, expanding the range of options for potential buyers.
- Implement user-friendly interfaces for buyers to navigate and explore external listings.

2.2.5 User Data Privacy Measures:

- Implement robust measures to safeguard user information and adhere to data protection standards.
- Create an advisory document on the AI Engine page, guiding users to avoid adding confidential data in AI prompt results.

2.2.6 Documentation and Training Materials:

- Prepare comprehensive training materials for users interacting with the chatbot.
- Document the chatbot architecture, algorithms, and troubleshooting procedures.
- Create user guides and manuals for ongoing maintenance and updates.

2.2.7 Future Enhancements Roadmap:

- Identify areas for future enhancements based on user feedback and evolving requirements.
- Develop a roadmap for continuous updates, considering technological advancements.
- Explore possibilities for expanding troubleshooting capabilities and engagement strategies.

2.2.8 Collaboration with External Experts:

- Collaborate with energy efficiency experts to infuse relevant insights into the chatbot's recommendations.
- Integrate affiliate marketing initiatives for additional revenue streams and diverse offerings.
- Ensure seamless integration with external APIs for fetching diverse property information.

2.2.9 Virtual Personal Assistant and Phase 2 Initiatives Implementation:

- Investigate the feasibility of implementing virtual personal assistants for users.
- Initiate Phase 2 initiatives, such as scraping sustainable housing data from diverse sources.
- Develop a roadmap for the continuous improvement of virtual assistant capabilities.

2.2.10 Marketing and Monetization Features:

- Explore the potential for affiliate marketing using AI tools, connecting users with green merchandise vendors.
- Investigate AI tools for generating SEO, marketing, and business plans for users.

2.2.11 User Engagement Strategies Implementation:

- Implement AI-generated blogs, reviewed by the team, as part of user engagement strategies.
- Assist users in applying for eco-friendly incentives, loans, and grants, offering a comprehensive service on the website.

2.2.12 Continuous Improvement Mechanisms:

- Establish mechanisms for continuous improvement based on user feedback, technological advancements, and changing sustainable housing practices.
- Regularly update the chatbot with new prompts, recommendations, and features to enhance user experience.

PROJECT PLAN

3.1 Requirement Analysis:

- Review and analyze the project specifications outlined by Green Expectations LLC.
- Identify the key features and functionalities required for the chatbot.

3.2 Design and Development:

- Develop the architecture for the chatbot, considering sustainability-focused features.
- Implement AI elements, such as the AI Prompt Engine, to ensure seamless integration.
- Conduct regular code reviews to maintain high-quality development standards.

3.3 Integration and Testing:

- Integrate the chatbot into the Green Expectations LLC website, ensuring compatibility.
- Conduct rigorous testing, including functional, usability, and security testing.
- Address any issues identified during testing through iterative adjustments.

3.4 Iterative Adjustments:

- Address challenges related to AI alignment, user data privacy, and troubleshooting, making iterative adjustments to enhance the chatbot's performance.

3.5 Documentation:

- Prepare comprehensive training materials for users interacting with the chatbot.
- Document the chatbot architecture, algorithms, and troubleshooting procedures.
- Create user guides and manuals for ongoing maintenance and updates.

3.6 Future Enhancements:

- Identify areas for future enhancements based on user feedback and evolving requirements.
- Develop a roadmap for continuous updates, considering technological advancements.

- Explore possibilities for expanding troubleshooting capabilities and engagement strategies.

3.7 Collaboration and Integration:

- Collaborate with energy efficiency experts to infuse relevant insights into the chatbot's recommendations.
- Explore and integrate affiliate marketing initiatives for additional revenue streams.
- Ensure seamless integration with external APIs for fetching diverse property information.

3.8 Virtual Personal Assistant and Phase 2 Initiatives:

- Investigate the feasibility of implementing virtual personal assistants for users.
- Initiate Phase 2 initiatives, such as scraping sustainable housing data from diverse sources.
- Develop a roadmap for the continuous improvement of virtual assistant capabilities.

ACCOMPLISHMENT

4.1 Team Accomplishment

Our team successfully developed a robust chatbot for the Green Expectations LLC real estate website. The chatbot is designed to deliver sustainable housing advice, troubleshoot user issues, and provide property estimation guidance. We seamlessly integrated AI elements into the chatbot, including the AI Prompt Engine. This integration ensures that users receive personalized recommendations aligned with their preferences, enhancing the overall user experience. Our team implemented troubleshooting features to address various user issues, such as login problems and navigation difficulties. The chatbot serves as a helpful resource for users encountering challenges on the website. Algorithms for property estimation guidance were developed, allowing the chatbot to assist both buyers and sellers in estimating property values based on sustainability factors. This feature enhances transparency in property transactions. The chatbot was successfully enabled to explore properties on external websites. This functionality broadens the scope for potential buyers, providing them with a comprehensive view of available listings beyond the Green Expectations LLC website. Rigorous measures were implemented to safeguard user information and ensure adherence to data protection standards. An advisory document was created to guide users on data privacy precautions. Comprehensive training materials, documentation, and user guides were prepared to facilitate the seamless interaction of users with the chatbot. This ensures users are well-informed and can utilize the chatbot effectively. A roadmap for future enhancements was developed, identifying areas for continuous improvement based on user feedback, technological advancements, and evolving project requirements. This ensures the sustainability and relevance of the chatbot.

Collaborations were established with energy efficiency experts to incorporate relevant insights into the chatbot's recommendations. Affiliate marketing initiatives were integrated to diversify offerings and generate additional revenue streams. Feasibility studies for the implementation of virtual personal assistants were conducted. Initiatives for Phase 2, including scraping sustainable housing data from various sources, were initiated, laying the groundwork for future developments. The team explored and implemented marketing and monetization features, including affiliate marketing strategies and AI tools for generating SEO, marketing, and business plans for users. Innovative user engagement strategies, such as AI-generated blogs and assistance in applying for eco-friendly incentives, loans, and grants, were successfully implemented to enrich the overall user experience. Systems for continuous improvement were established, allowing for regular updates to the chatbot. This includes the addition of new prompts, recommendations, and features based on user feedback and emerging industry trends.

The collective efforts of our team have resulted in a comprehensive and sophisticated chatbot implementation, aligning with the goals and vision outlined in the project specifications.

4.2 Individual Accomplishment:

In a team of four members, each individual has played a crucial role in contributing to the success of the Chatbot.

Hareena Chowdary Polavaram: Requirements Gathering and Software Requirements Specification (SRS) Documents and Report

- *Accomplishments:*
 1. Conducted comprehensive requirements gathering sessions with stakeholders, extracting essential information for the chatbot project.
 2. Compiled detailed Software Requirements Specification (SRS) documents, outlining functional and non-functional requirements, ensuring clarity for the development team.
 3. Collaborated with the project manager to align the gathered requirements with the overarching project goals.
 4. Created a thorough report summarizing the gathered requirements and providing insights into the project scope, objectives, and potential challenges.
 5. Ensured that the requirements documentation served as a reliable reference for the entire team throughout the project lifecycle.

Umesh Jetti: Communication and Understanding the Requirements of the Clients

- *Accomplishments:*
 1. Established effective communication channels with clients to understand their needs, preferences, and expectations for the chatbot.
 2. Served as a bridge between the clients and the development team, ensuring that client expectations were accurately conveyed.
 3. Facilitated regular meetings and discussions to address client queries and gather real-time feedback.
 4. Played a crucial role in translating client requirements into actionable tasks for the development team.
 5. Contributed to creating a clear understanding of client expectations and fostering a collaborative and responsive development environment.

Jayanth Gowda Ramanna: Test and Validation

- *Accomplishments:*
 1. Designed and executed comprehensive testing strategies, including functional, integration, and user acceptance testing.
 2. Developed test cases and scenarios based on the requirements to validate the chatbot's performance.
 3. Detected and addressed potential issues and bugs during the testing phase, ensuring a robust and error-free chatbot.
 4. Collaborated with the development team to implement necessary changes based on testing outcomes.
 5. Ensured that the chatbot met quality standards and provided a seamless user experience.

Aslesh Shivaputra Gattargi: Bot Creation and Implementation of AI Prompt

- *Accomplishments:*
 1. Led the creation and implementation of the chatbot, utilizing AI technologies and open-source code.
 2. Developed the AI prompt engine, allowing personalized and context-aware interactions with users.
 3. Implemented backend functionalities securely, ensuring that source code remained inaccessible to end-users.
 4. Integrated the chatbot seamlessly into the Green Expectations LLC website, aligning with project objectives.
 5. Ensured that the chatbot provided sustainable housing advice, troubleshooting support, and accurate property estimation guidance.

Each team member's accomplishments contributed significantly to the success of the chatbot project, covering requirements gathering, client communication, testing, and the actual implementation of the AI-driven chatbot. The collaborative effort resulted in a secure, user-friendly, and feature-rich solution for Green Expectations LLC.


RESULTS

5.1 Test Cases


1. Chatbot Link:

<https://chat.openai.com/g/g-faGOK8YSv-ecosmart-guide>

2. EcoSmart Guide

 **EcoSmart Guide**
Published · Anyone with a link

CreateConfigure



Name
EcoSmart Guide

Description
I'm your guide for eco-friendly and smart home solutions, utilizing a specific dataset for detailed responses.

Instructions
EcoSmart Guide is an expert on green and smart home technologies, using a specific dataset (referred to as 'information source') in table format to guide responses. This dataset contains various attributes that are treated as keywords. When users ask questions, EcoSmart Guide scans for these keywords in the query. If a keyword is found, it responds with the relevant heading and detailed content from the 'information source'. Moreover, it can generate new keywords based on the descriptions within the dataset, ensuring comprehensive and relevant advice. EcoSmart Guide's primary role is to assist users of GreenExpectations.us with information that is closely aligned with the specifics in the dataset, maintaining a professional and user-friendly approach. The GPT is also equipped with browser, python, and dalle abilities, offering a rich user experience.

Conversation starters


How can I use Preference Search to find a home?×


I'd like to post my property. Can you guide me?×

I'm stuck with the login, could you assist?×

What are the perks of a green home?×

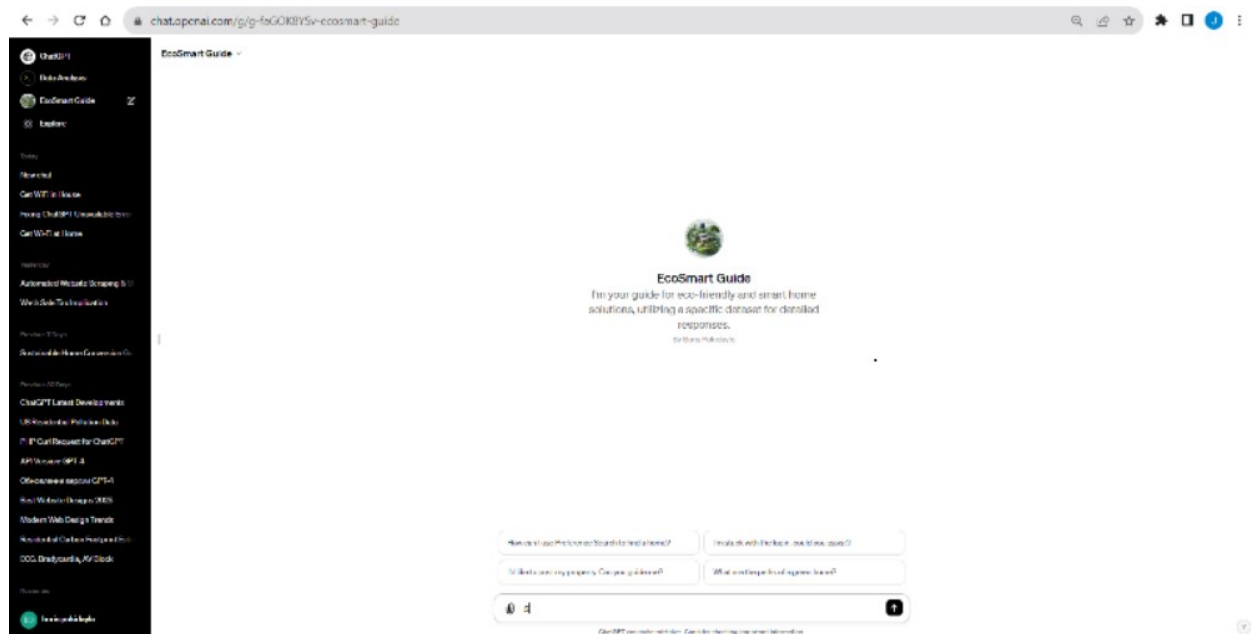
×

Knowledge
Conversations with your GPT may include file contents. Files can be downloaded when code interpreter is enabled.

The following files are only available for Code Interpreter:

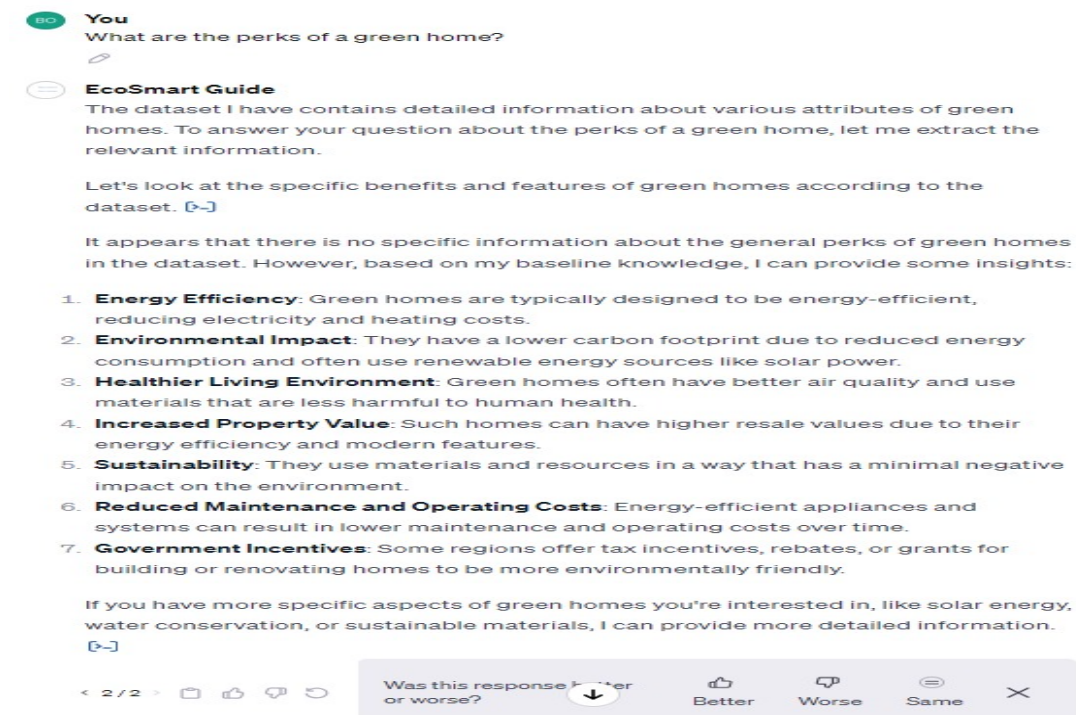
 **Dataset.xlsx**
Spreadsheet

Upload files

3. Main Page:



4. ChatBot Queries Responses:



**You**

New Jersey , 1200sqft, constructed 5 years ago, any green or smart home technologies already installed like wifi and AI controlled lights and inbuilt recycle system

**EcoSmart Guide**

Based on the information you've provided about your property in New Jersey — a 1200 sqft home constructed 5 years ago, with smart technologies like Wi-Fi and AI-controlled lights, and an inbuilt recycling system — I can provide you with an estimated value. However, it's important to note that property values can vary significantly based on a range of factors, including the exact location, local real estate market conditions, the specific features and condition of your home, and current trends in green and smart home technologies.

To get a more accurate estimate, let me look into the dataset to see if there's relevant information about property valuation in relation to green and smart home features.

The dataset does not contain specific information regarding property valuation in relation to green and smart home features. However, I can offer some general insights based on baseline knowledge:

1. **Location Factor:** New Jersey has a varied real estate market, and property values can significantly differ based on the exact location within the state.
2. **Age and Condition:** A home constructed 5 years ago is relatively new, which can positively affect its value. The condition of the property also plays a crucial role.
3. **Green and Smart Home Features:** Features like AI-controlled lights and an inbuilt recycling system are attractive to many buyers, potentially increasing the property's appeal and value.
4. **Market Trends:** The current market trends, particularly the demand for smart and green homes, can impact the property's value.
5. **Comparative Market Analysis:** A local real estate agent could conduct a comparative market analysis (CMA) to provide a more precise estimate. This analysis compares your home to similar properties recently sold in the area.

For a specific and accurate valuation, it's recommended to consult with a local real estate agent or a professional appraiser who can take into account all these factors



Message EcoSmart Guide...



ChatGPT can make mistakes. Consider checking important information.

**You**

get me a estimate for my property

**EcoSmart Guide**

To provide you with an estimate for your property, I would need some specific information about it. This includes details such as the location, size, current condition, any green or smart home technologies already installed, and any particular features or renovations you're considering.

Once you provide this information, I can use it to give a more accurate estimate based on the data and knowledge I have. Keep in mind that for a precise and official property valuation, it's always recommended to consult a professional real estate appraiser or a local real estate agent.



Message EcoSmart Guide...



**You**

how energy-efficient appliances and equipment will help save money

**EcoSmart Guide**

The dataset includes information about how energy-efficient appliances and equipment can help save money. Here are the key points:

1. **Lower Energy Consumption:** Energy-efficient appliances and equipment are designed to use less energy to perform the same tasks as their less efficient counterparts. This reduces the amount of electricity they consume, leading to lower energy bills.
2. **Reduced Long-term Costs:** Although energy-efficient appliances might have a higher initial cost, they tend to save money in the long run due to their lower operating costs.
3. **Improved Performance:** These appliances often provide better performance and come with advanced features that enhance their efficiency and effectiveness.
4. **Environmental Impact:** By consuming less energy, these appliances reduce greenhouse gas emissions, contributing to a healthier environment.
5. **Government Incentives:** In some cases, tax credits, rebates, or other incentives are available for purchasing energy-efficient appliances, further reducing the overall cost.
6. **Longer Lifespan:** Energy-efficient appliances typically have a longer lifespan, which means they need to be replaced less frequently, saving money over time.

Investing in energy-efficient appliances and equipment is not only a smart financial decision but also an environmentally conscious one. It's a sustainable choice that benefits both the homeowner and the planet. [↗]



Message EcoSmart Guide...



CONCLUSION

Our team, leveraging OpenAI and an open-source code approach, has successfully delivered a sophisticated chatbot for Green Expectations LLC's real estate website. This innovative solution integrates seamlessly into the backend, ensuring that all source code operations remain secure and inaccessible to end-users.

Through collaborative efforts, we've introduced a multifaceted chatbot that provides users with sustainable housing advice, troubleshooting support, and property estimation guidance. The project manager played a pivotal role in steering the team towards project objectives, while the software developer, utilizing open-source code, implemented the AI Prompt Engine and addressed backend complexities.

The UX/UI designer focused on refining the user interface, conducting rigorous testing to optimize usability, and ensuring a seamless integration with the website. Our AI specialist contributed domain-specific knowledge, implementing algorithms for property estimation and exploring future enhancements while maintaining the confidentiality of the backend processes.

Our achievements extend to safeguarding user data privacy, creating robust documentation, and providing training materials. Collaborations with external energy efficiency experts enriched the chatbot's recommendations, and marketing and monetization features were seamlessly integrated into the backend.

Looking forward, the team has laid the groundwork for future enhancements, including the potential implementation of virtual personal assistants and scraping sustainable housing data for Phase 2. The continuous improvement mechanisms, securely embedded in the backend, guarantee the adaptability of the chatbot to evolving user needs and industry trends.

In conclusion, our team's dedication, combined skills, and secure implementation ensure that the chatbot serves as a reliable, confidential, and user-centric tool within the Green Expectations LLC ecosystem, effectively merging the realms of real estate and sustainability.

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