Hotel Energy Benchmarking & Optimization Demo

Entrepreneurial Use Case – Eliq Application

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🚀 Concept

Hotels often consume more energy than necessary — especially during **low occupancy periods** like overnight hours or off-season days.

What if we could use open energy, weather, and occupancy data to help hotel operators make smarter real-time decisions?

This tool demonstrates how:

- Hourly energy consumption can be **benchmarked** against peer properties
- Inefficiencies during low-occupancy periods can be **detected automatically**
- **Actionable insights or automations** can reduce unnecessary usage

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🧠 Why It Matters

- 5–20% **energy savings** potential in hospitality through data-driven behavior
- Supports sustainability goals with **no hardware investment**
- Shows how real-time energy intelligence can be **applied outside utilities**

🧪 Try the Prototype

An interactive Streamlit app simulates:

- Realistic hotel energy & occupancy data
- Visual benchmarking vs. peers
- Insights & mock automation triggers

▶️ **Live Demo:**

👉 https://hotel-energy-optimizer-6ngtwvacvqmkbhxan5cr5e.streamlit.app/

No installation is required.

📸 **Preview**

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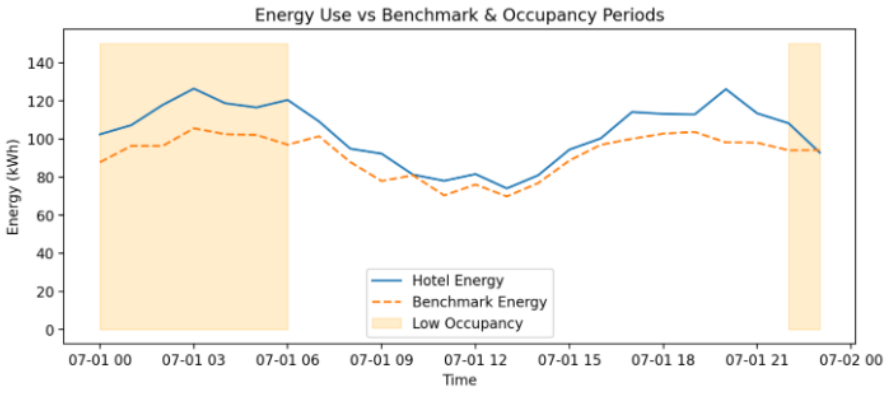
Hourly Energy Consumption & Occupancy

	Hour	Hotel Energy (kWh)	Benchmark Energy (kWh)	Occupancy
0	2025-07-01 00:00:00	102.5	87.8	20.0%
1	2025-07-01 01:00:00	107.3	96.4	20.0%
2	2025-07-01 02:00:00	117.9	96.4	20.0%
3	2025-07-01 03:00:00	126.5	105.6	20.0%
4	2025-07-01 04:00:00	118.8	102.6	20.0%
5	2025-07-01 05:00:00	116.6	102.2	20.0%
6	2025-07-01 06:00:00	120.5	97.1	20.0%
7	2025-07-01 07:00:00	109.2	101.5	90.0%
8	2025-07-01 08:00:00	94.9	87.9	90.0%
9	2025-07-01 09:00:00	92.3	78.0	90.0%



⚠️ Energy inefficiency detected during low occupancy hours!

During these times, your hotel consumes more energy than peers, suggesting potential savings.

	Hour	Hotel Energy (kWh)	Benchmark Energy (kWh)
0	2025-07-01 00:00:00	102.4836	87.8225
1	2025-07-01 01:00:00	107.2767	96.4197
2	2025-07-01 02:00:00	117.8552	96.3586
3	2025-07-01 03:00:00	126.4604	105.6367
4	2025-07-01 04:00:00	118.7826	102.5625
5	2025-07-01 05:00:00	116.587	102.1515
6	2025-07-01 06:00:00	120.5178	97.0595
22	2025-07-01 22:00:00	108.3057	94.1335

Recommendation:

Consider reducing heating, cooling, or lighting during low occupancy hours (e.g., 10pm–6am). Implement automated controls or behavioral nudges to save energy and costs.

Activate Energy Saving Automation for Low Occupancy

Automation triggered: HVAC and lighting schedules adjusted for low occupancy hours.

📂 Code & Documentation

The full project is open source and available on GitHub:

🔗 GitHub Repository: https://github.com/PatrickSimmank/hotel-energy-optimizer.git
📄 Includes source code, setup instructions, and this PDF

🙋 About Me

I'm **Patrick Simmank**, holding a double Master's degree in **Sustainable Energy Systems** from **Chalmers** and the **University of Stuttgart**.
I enjoy turning data into insight, and insight into action — fast.

Currently, I'm exploring Python-based app development using VS Code and Expo Go in a side project. Always eager to build and learn.