



## Team Details

- Team name – Pixel Pioneers
- Team leader name – Parth Aggarwal
- Team members – Aryan Bansal , Kundan Sahil
- Problem Statement - Educational campuses experience significant energy inefficiencies due to the absence of real-time monitoring, predictive insights, and cost-effective optimization tools.

A M D S L I N G S H O T H A C K A T H O N

# ENERGY GUARDIAN

*AI-Powered Campus Energy Monitoring*



# THE PROBLEM



**40%**

of global energy  
consumed by buildings



**30%**

wasted due to  
poor monitoring



**0**

real-time visibility  
in most campuses

*Campuses are flying blind. Energy bills spike. Nobody knows why.*

# THE IDEA

**One dashboard.  
Every watt.  
Every zone.  
In real-time.**



Live demand curves & forecasting



Solar / Grid / Battery mix tracking



AI chatbot for instant answers



Smart alerts before things go wrong

# OPPURTUNITIES



## BLIND SPOTS

No real-time zone-level visibility on campuses



## CLOUD TRAP

Expensive, cloud-dependent & reactive systems



## WASTED WATTS

Lights on in empty rooms, AC running after hours



## NO 3-IN-1

Zero affordable live monitoring + 3D + AI solution

*Campuses hemorrhage energy — invisible, unchecked, and costly.*

# HOW IS IT DIFFERENT?

Predictive · Affordable · **Privacy-First**

## ✗ Existing Solutions

Cloud-based analytics

Reactive reporting only

High deployment cost

Text-only dashboards

No conversational interface

Limited transparency

## ✓ Energy Guardian

Fully on-device (AMD AI PC)

Predictive AI demand forecasting

Zero additional infrastructure

Interactive 3D WebGL campus map

Built-in AI energy chatbot

Explainable zone-level recommendations

**One platform. On-device. No cloud. No compromise.**

# FEATURES

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## 3D Campus Map

WebGL interactive  
building visualization



## Live Grid Status

Voltage, frequency  
& power quality



## Solar PV

Rooftop array  
& MPPT monitoring



## Alert Engine

Instant anomaly  
detection & alerts



## AI Chatbot

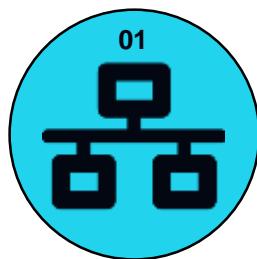
Natural language  
energy intelligence



## Analytics

Weekly reports &  
sustainability tracking

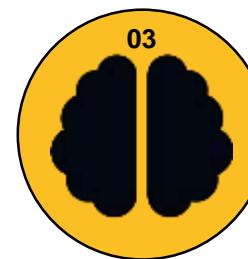
# PROCESS FLOW DIAGRAM

**Sensors**

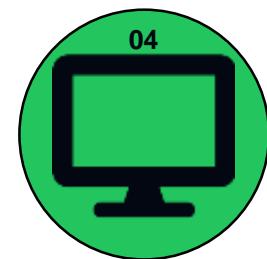
Campus IoT  
sensors collect data

**Ingest**

Real-time data  
streaming & parsing

**AI Engine**

Anomaly detect  
& forecasting

**Dashboard**

Live visualisation  
& alerts

*Everything automated. Zero config. Just plug it in.*

# WIREFRAMES/MOCK DIAGRAMS

4 Key Screens

9 Functional Tabs

1 Single-File Platform

Full working prototype available — single-file HTML application (index.html) with 9 tabs, Three.js 3D campus, live SVG charts, and AI chatbot.

Screen 1

**Overview Dashboard**

Screen 2

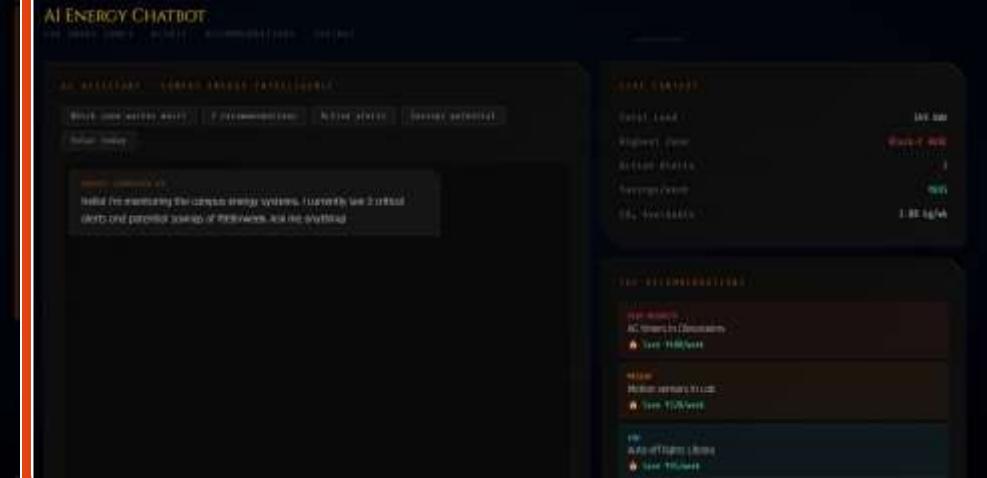
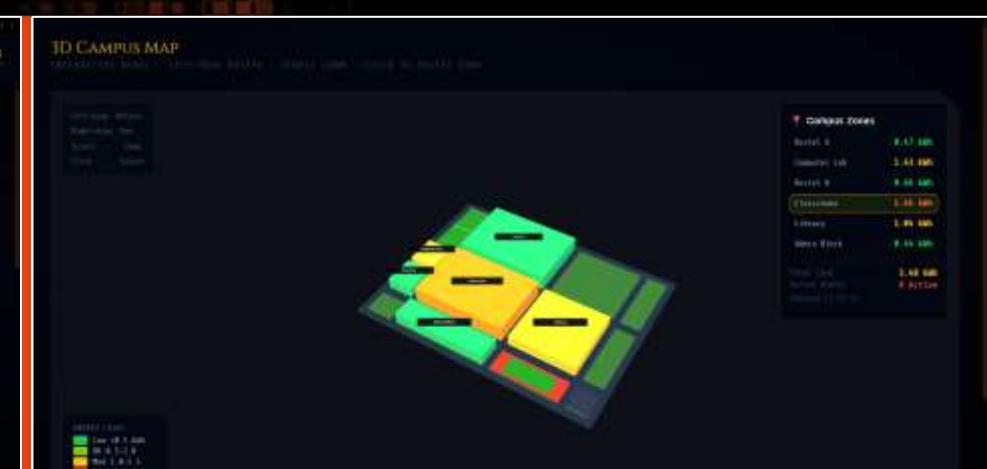
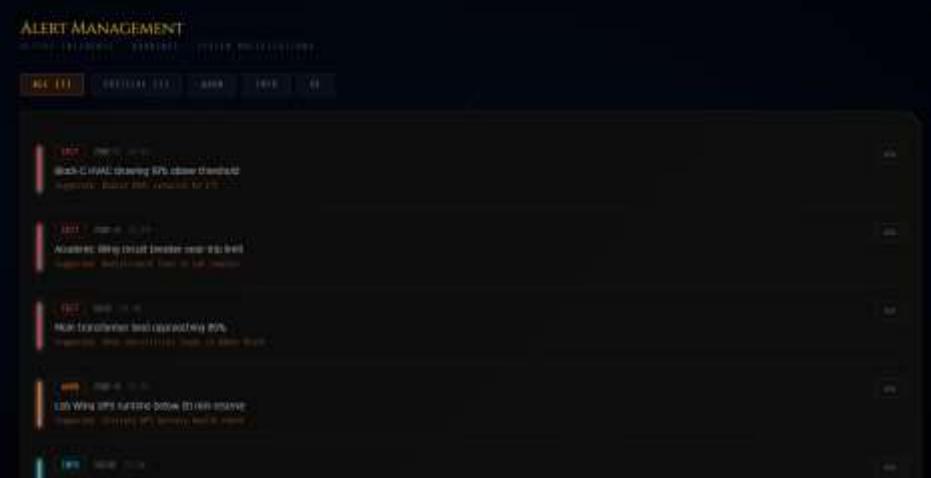
**3D Campus Map**

Screen 3

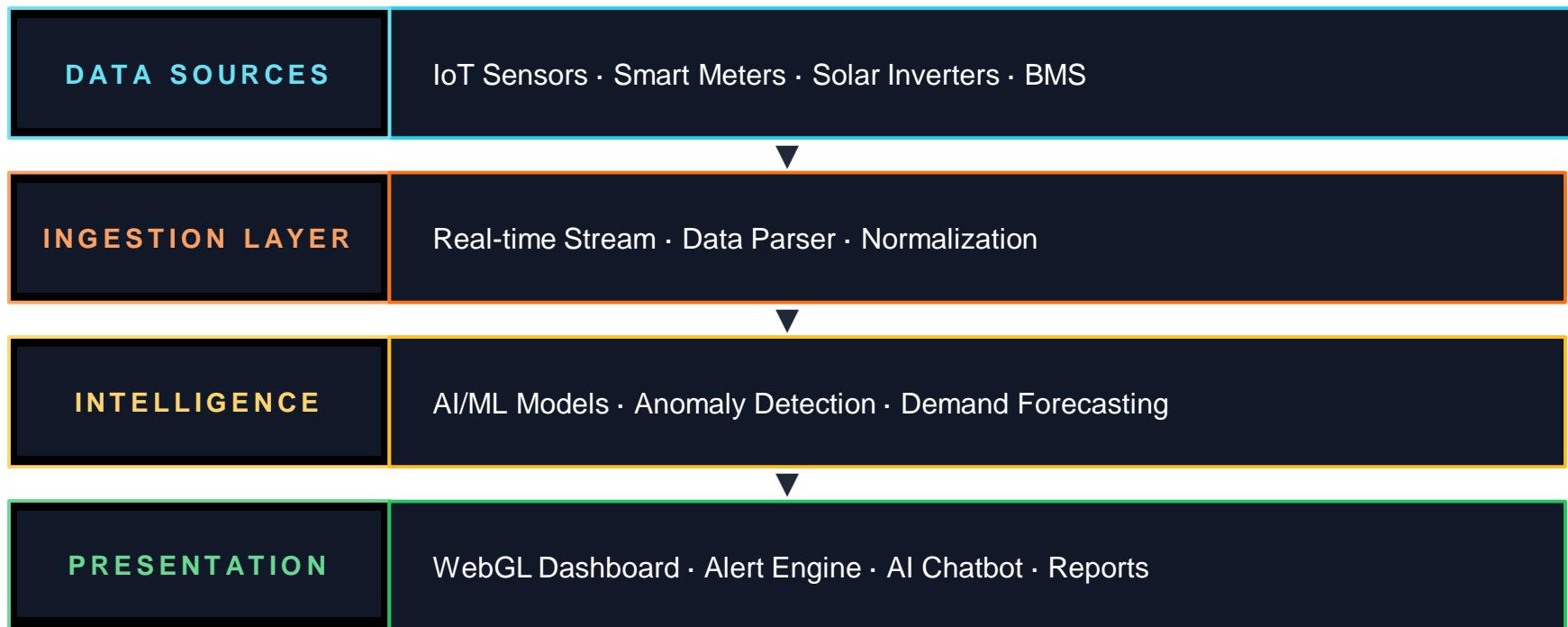
**Alerts Management**

Screen 4

**AI Energy Chatbot**



# ARCHITECTURE



# TECH STACK



## Frontend

HTML5 · CSS3 · Vanilla JS · Three.js  
(WebGL)



## Visualisation

Canvas API · Chart.js · CSS Animations



## AI / ML

Bell-curve demand modelling · ONNX  
Runtime · Anthropic Claude API (chatbot)



## AMD Products

AMD Ryzen AI PC · Radeon GPU (DirectML)  
· NPU (VitisAI / ONNX Runtime)



## Deployment

Python 3 · CustomTkinter · http.server (local)  
· Offline-first, zero cloud



## Data Layer

Local JSON · SQLite · ReportLab (PDF) · 5-second live refresh cycle

# AMD INTEGRATION

## Powered by AMD

*Energy Guardian leverages the full AMD AI PC architecture — CPU for orchestration and rule logic, Radeon GPU (DirectML) for 3D WebGL rendering and dashboard animations, and Ryzen AI NPU (VitisAI/ONNX) for on-device demand forecasting and anomaly detection. No energy data ever leaves the campus network.*



### AMD Hardware

AMD Ryzen AI PC (CPU + GPU + NPU)

### AMD Software

ONNX Runtime (VitisAI + DirectML) · ROCm · Anthropic Claude API

### Performance

100% on-device · ₹46,540/yr savings · Zero cloud latency

# PROTOTYPE ASSETS



## GitHub Repository

[github.com/I-Parth-Aggarwal-I/AI\\_Campus\\_Energy\\_Guardian](https://github.com/I-Parth-Aggarwal/I/AI_Campus_Energy_Guardian)

Public · Open Source · All assets included



## Demo Video

[youtu.be/-DBfs5aHK\\_8](https://youtu.be/-DBfs5aHK_8)

3 min walkthrough · All features shown



## Prototype

[https://i-parth-aggarwal-i.github.io/AI\\_Campus\\_Energy\\_Guardian/](https://i-parth-aggarwal-i.github.io/AI_Campus_Energy_Guardian/)

Overview · 3D Campus · AI Chatbot



**AMD**  
Slingshot

**HUMAN *IMAGINATION***  
**BUILT WITH *AI***

Powered by **H2S**

**Thank you!** •