



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



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

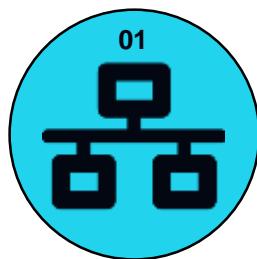
Natural language
energy intelligence



Analytics

Weekly reports &
sustainability tracking

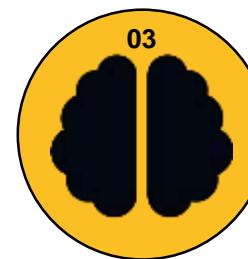
PROCESS FLOW DIAGRAM

**Sensors**

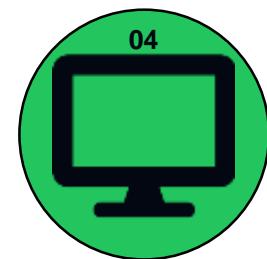
Campus IoT
sensors collect data

**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

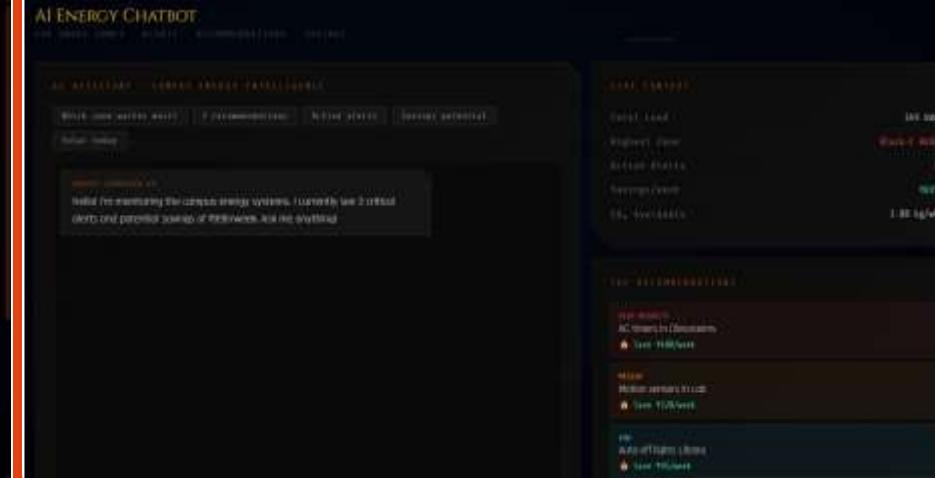
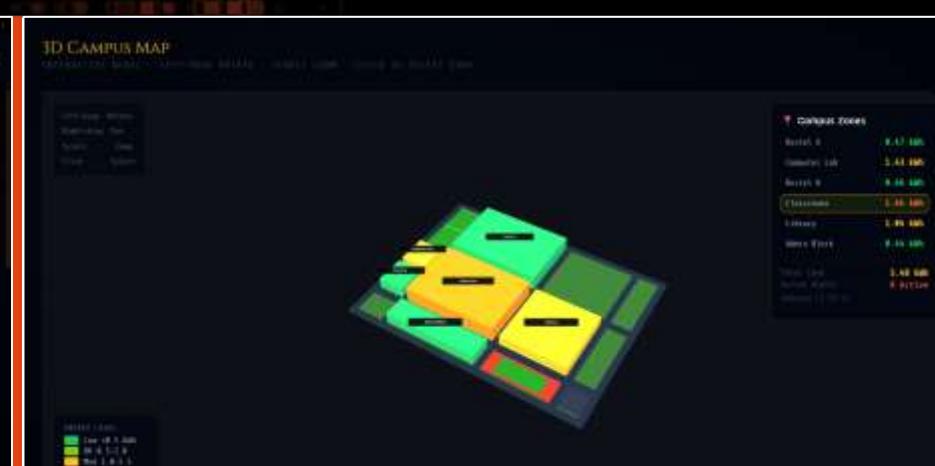
AI Energy Chatbot



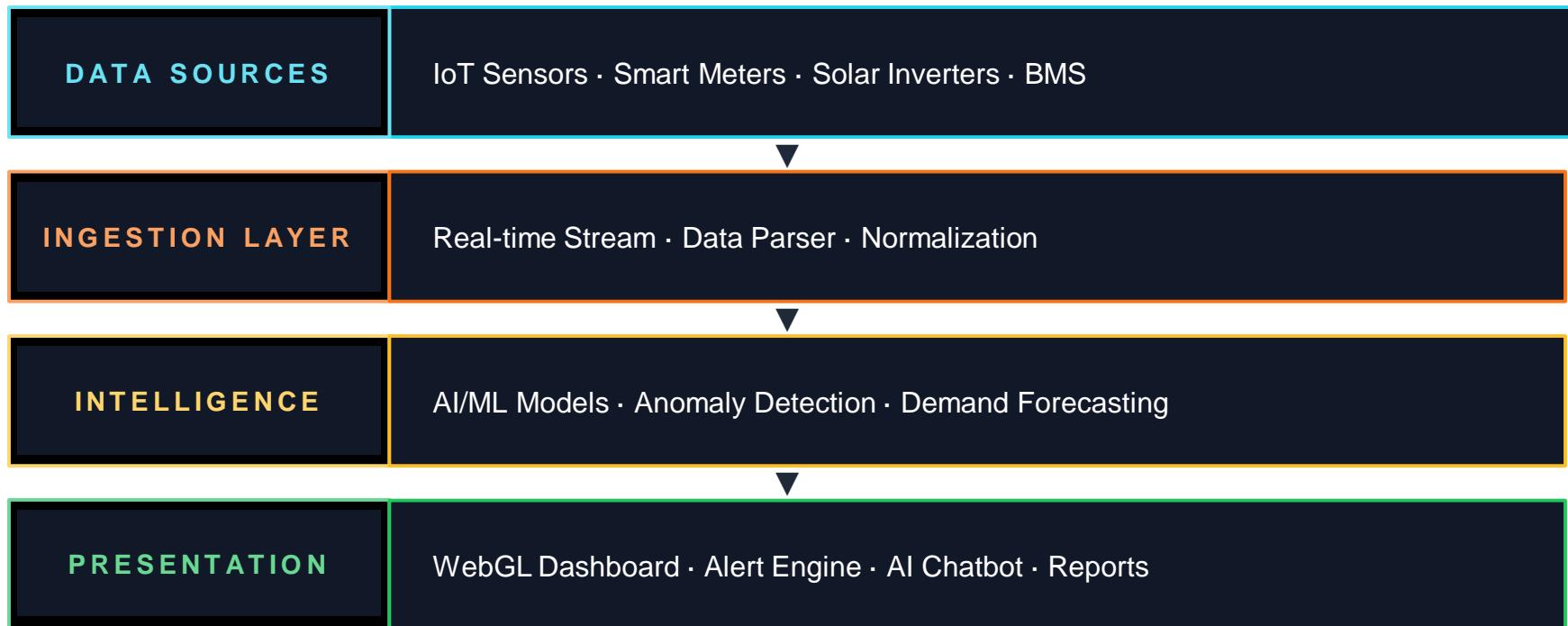
ALERT MANAGEMENT

Alerts

Type	Description	Status
Critical	CHP Unit 1000: Chassis temperature rising 5% above threshold.	Active
Warning	CHP Unit 2000: Mean efficiency less than 80%.	Active
Informational	CHP Unit 3000: Left Wing UPS running below 10V min limit.	Active



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

IMPLEMENTATION COST

Cloud Infrastructure	₹0 /mo
AI/ML API Costs	₹0 /mo
Hardware (Sensors)	₹1,00,000 - ₹2,50,000
Development	₹2,00,000 - ₹5,50,000
Total Estimated Cost:	₹3,00,000 - ₹8,00,000



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

3 min walkthrough · All features shown



Prototype

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! •