

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.

AMD SLINGSHOT HACKATHON

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

OPPORTUNITIES



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

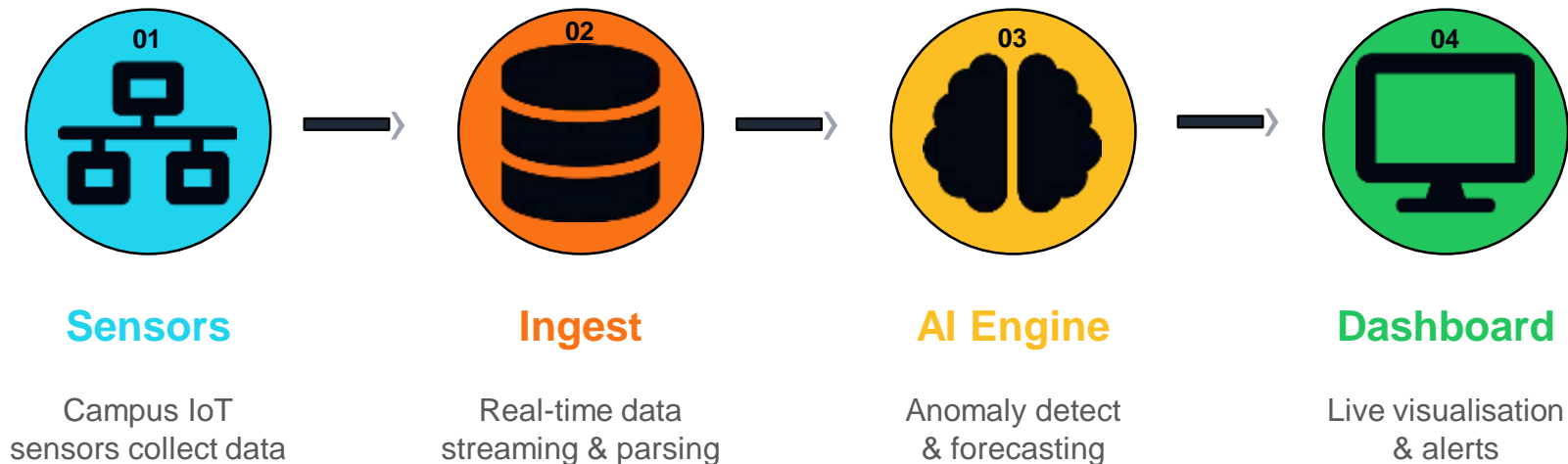
Natural language
energy intelligence



Analytics

Weekly reports &
sustainability tracking

PROCESS FLOW DIAGRAM



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

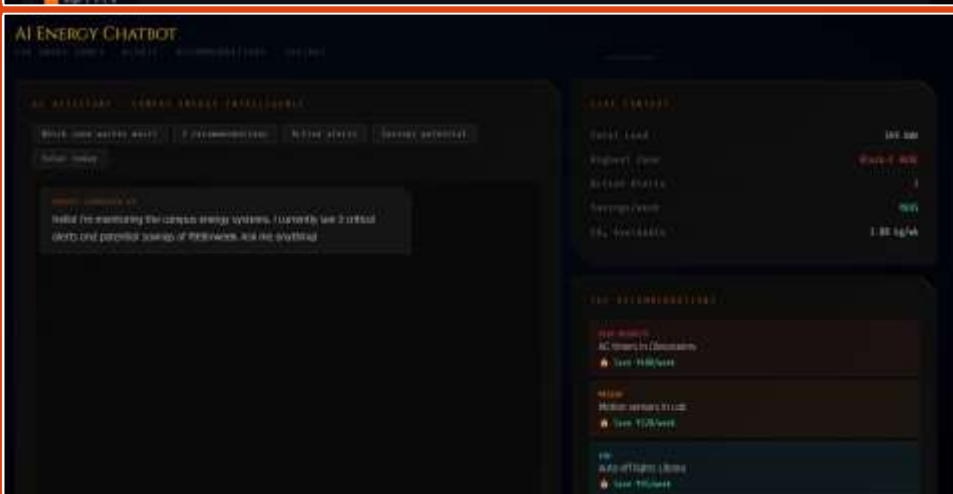
3D Campus Map

Screen 3

Alerts Management

Screen 4

AI Energy Chatbot



ARCHITECTURE

DATA SOURCES

IoT Sensors · Smart Meters · Solar Inverters · BMS



INGESTION LAYER

Real-time Stream · Data Parser · Normalization



INTELLIGENCE

AI/ML Models · Anomaly Detection · Demand Forecasting



PRESENTATION

WebGL Dashboard · Alert Engine · AI Chatbot · Reports

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

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 **I 125**

Thank you!

