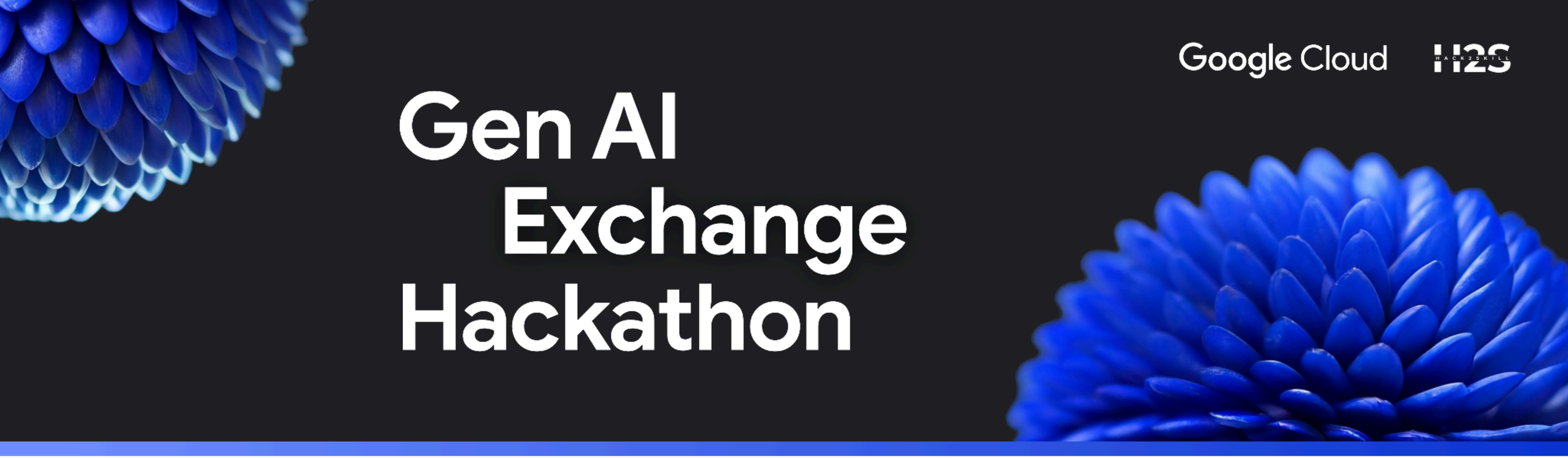


Team Name : Team Alchemy

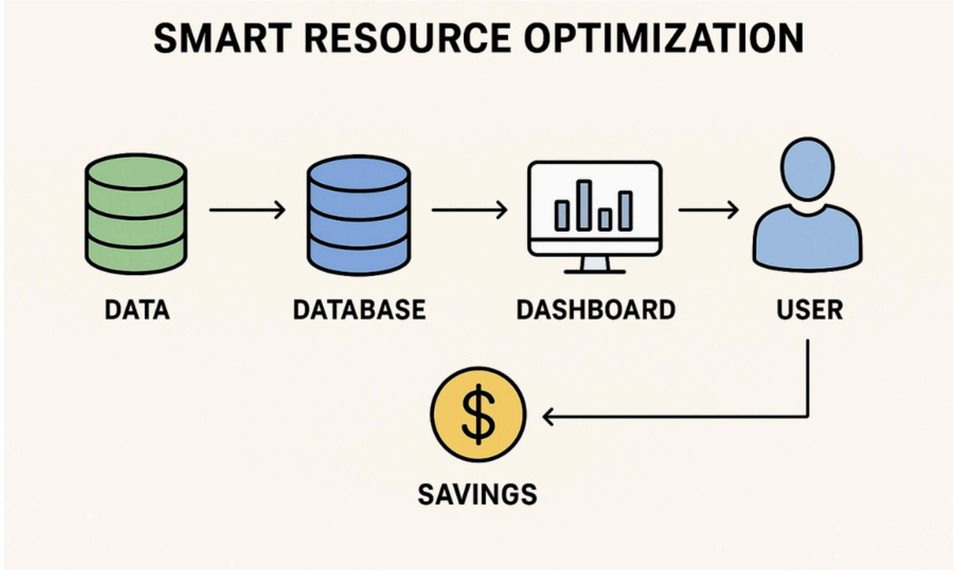
Team Leader Name : Aadarsh Kumar

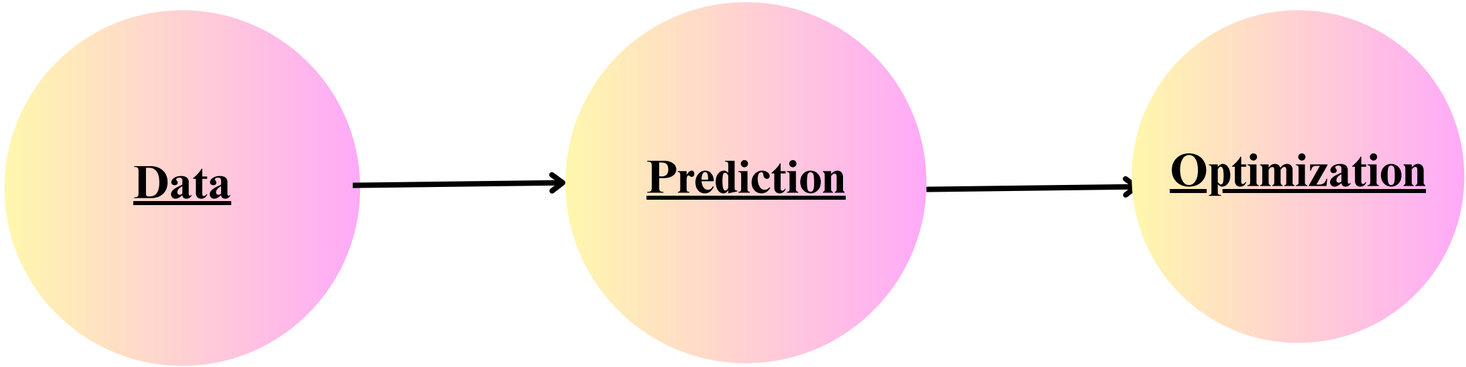
Problem Statement : Smart Resourse Optimization

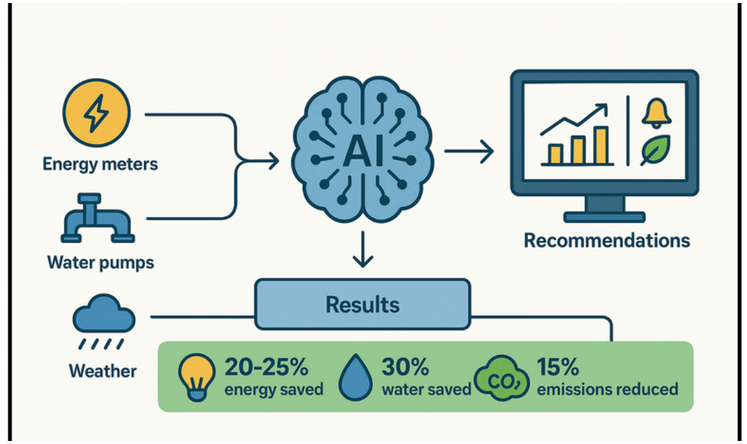
EcoTrac

Smart Resource Optimization:

- Combines energy & weather data for efficient resource use
- Predicts high-demand days (e.g., heatwaves) for planning
- Suggests actions like “Shift irrigation to evening”
- Saves 15-20% energy, 25% water, and reduces emissions by 18%

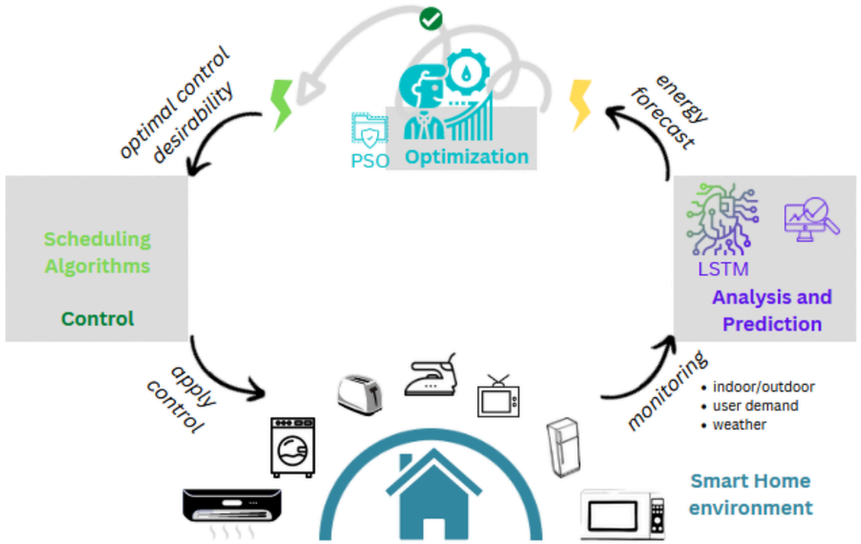






Technologies

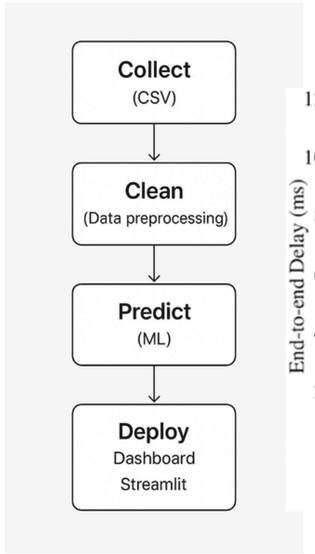
- Python
- Pandas, Scikit-learn
- Streamlit, PostgreSQL

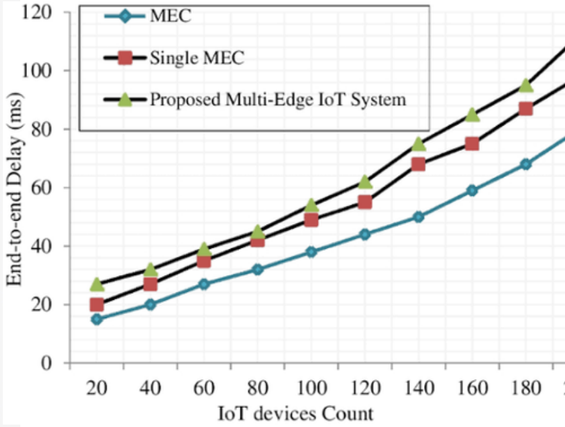


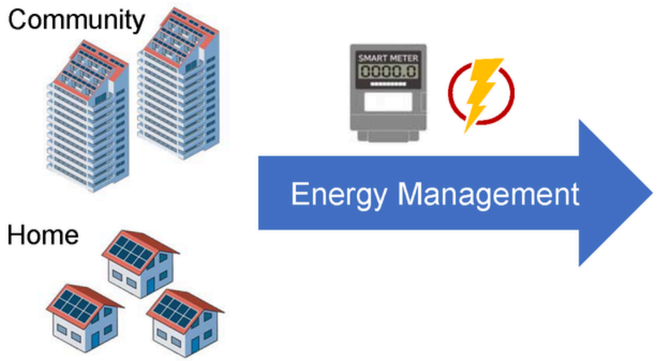
Methodology

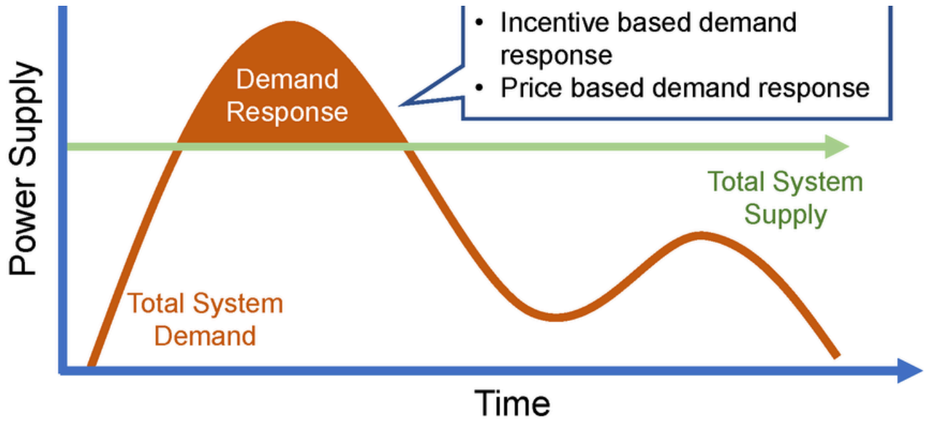
- Steps: Collect → Clean → Predict → Deploy
- Flow: CSV → ML → Dashboard
- Prototype: Streamlit app

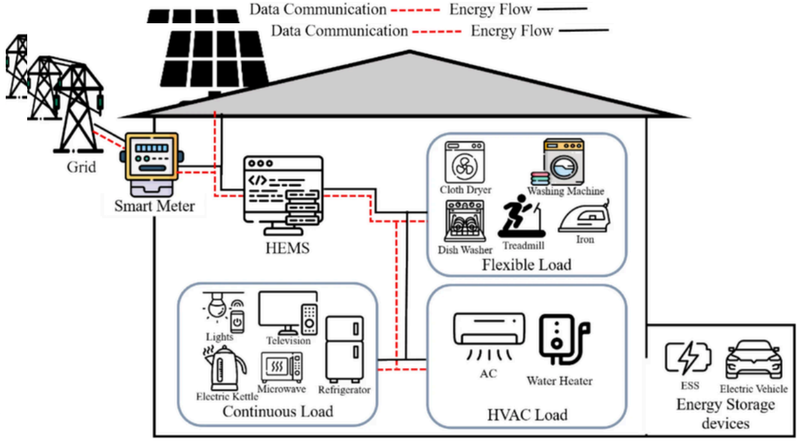
Flowchart





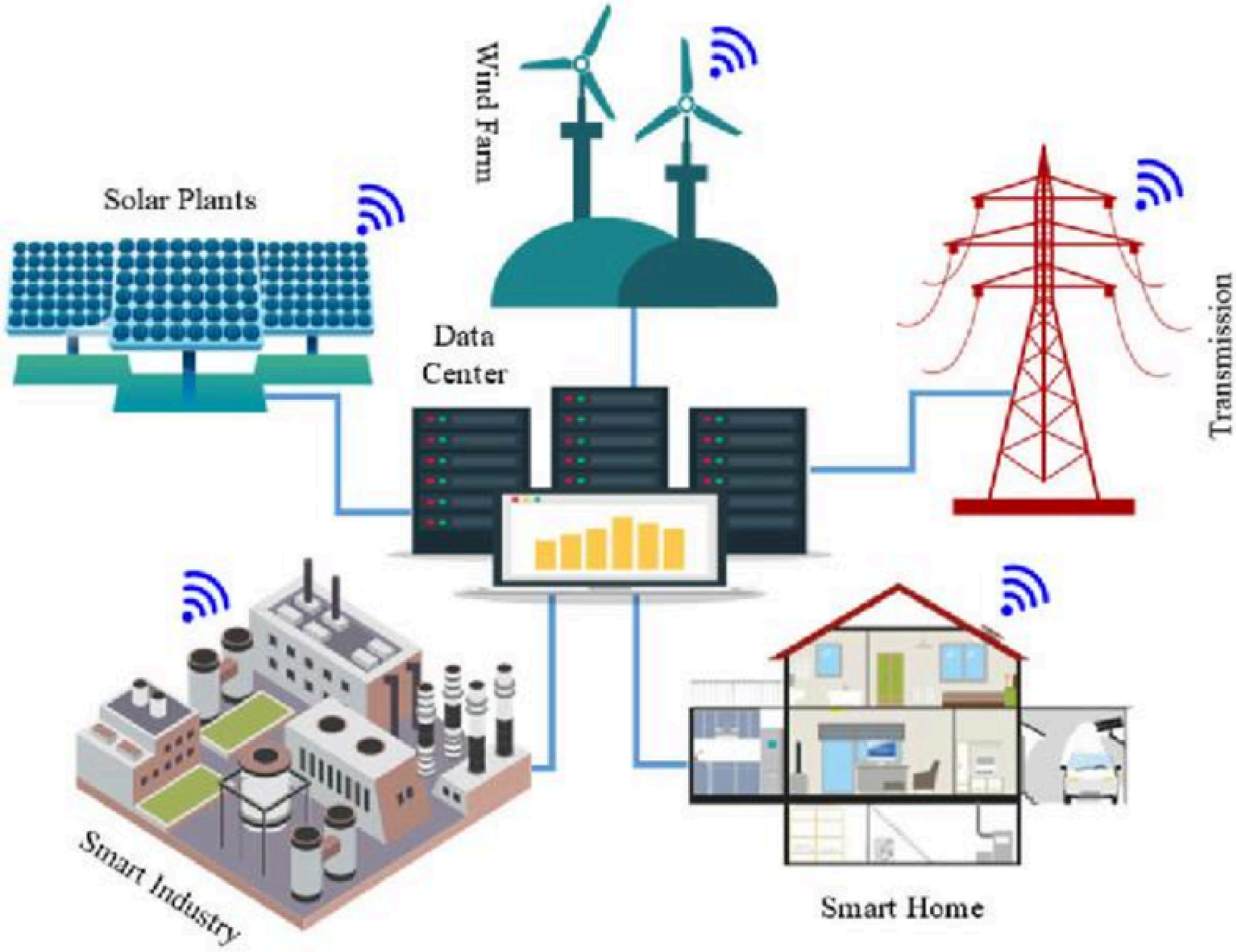


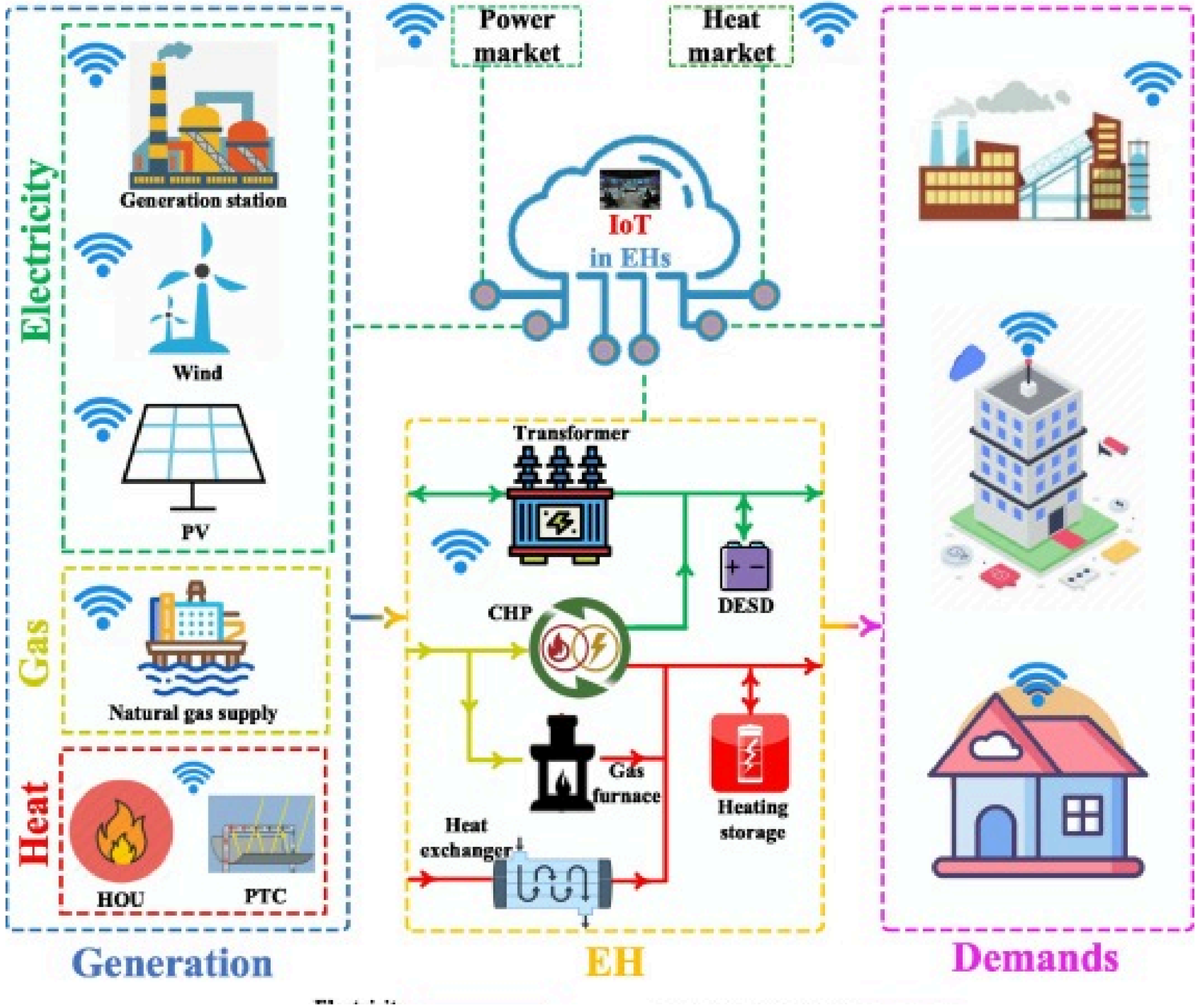




FEASIBILITY AND VIABILITY

TECHNICAL	ECONOMIC	OPERATIONAL	MARKET	OVERALL
Uses open-source PostgreSQL	Free datasets (data.gov.in, IMD)	Simple Streamlit UI with Hindi support	High rural demand (70% farmers)	Very feasible (8/10)
Python	low-cost cloud (~₹5,000/month)	aligns with India's green goals	unique crop-weather focus vs. urban apps	quick demo
Pandas	15-20% user savings	pilot-ready.		calable
Streamlit				sustainable
scikit-learn				
prototype in 6 weeks				


Wind Farm
Solar Plants
Data
Center
Transmission
Smart Industry
Smart Home


Power market
Heat market
Electricity
Generation station
Wind
PV
IoT
in EHs
Transformer
DESD
CHP
Gas
Natural gas supply
Gas furnace
Heating storage
Heat exchanger
Heat
HOU
PTC
Generation
EH
Demands

Technologies:-

1. Programming Language:
   - Python → Core language for building the solution
2. Data Handling & Machine Learning:
   - Pandas → Data collection and cleaning
   - Scikit-learn → Machine learning model for predictions
3. Database:
   - PostgreSQL → For structured storage and retrieval of energy & weather data
4. Frontend / Dashboard:
   - Streamlit → Interactive web app for visualization and decision support
5. Workflow Approach:
   - Collect → Clean → Predict → Deploy (end-to-end pipeline)

Estimated Implementation Cost:-

1. Software & Tools:
   - Python, Pandas, Scikit-learn, Streamlit, PostgreSQL → Free (Open Source)
2. Cloud / Hosting (for pilot run):
   - Basic server (AWS/GCP/Heroku/Render) → ₹2,000 – ₹3,000 per month
3. Data Storage:
   - PostgreSQL cloud instance → ₹1,000 – ₹1,500 per month
4. Prototype Hardware (if IoT sensors are added in future):
   - Weather/energy sensors (optional extension) → ₹5,000 – ₹10,000 one-time

Google Cloud H2S HACK2SKILL

Gen AI Exchange Hackathon

Thank you