

# Context

Turning off one bulb for five hours a day  
**saves 2.1 kWh and about ₱21.00/month**

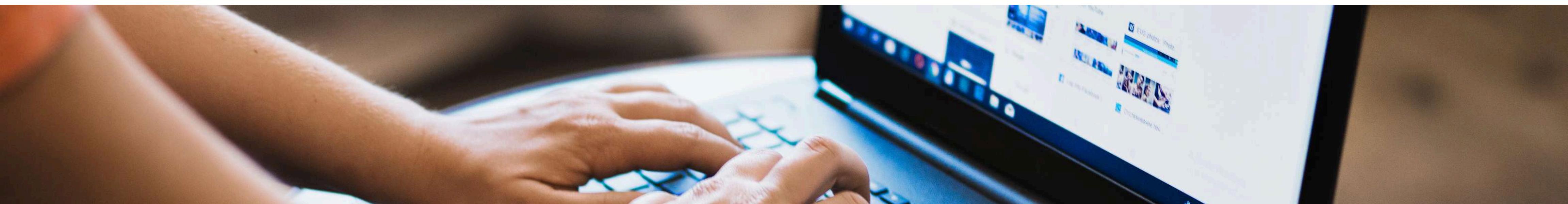
*Department of Energy, 2018*



# Context

Screensaver does not save energy, sleep is 90% better, but **shutting down and unplugging is best.**

*Meralco. (n.d.).*



# Context

**421 home fires** were caused by  
overheated appliances in 2020, an  
11.38% increase from 2019

*Bureau of Fire Protection, 2020*



# Challenge

How might we help people become  
*instantly aware* of their wasteful and  
dangerous energy habits, so they  
can take action before it's too late?







**volt<sup>g</sup>uard**





where **Safety** and **Savings** meet



# Introduction



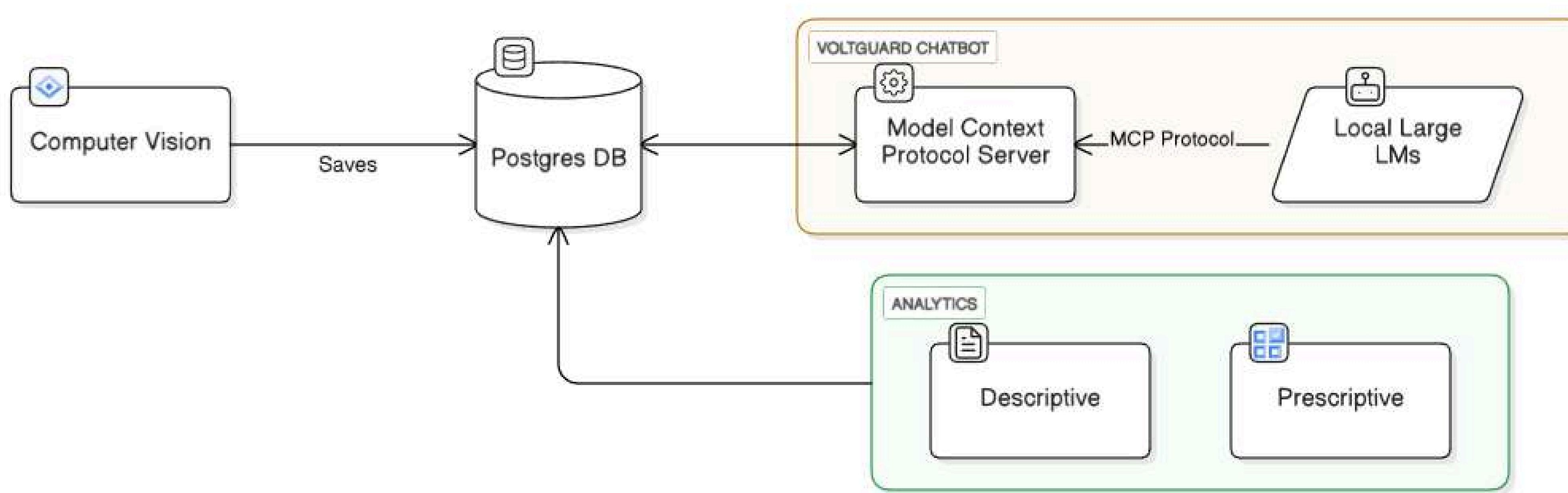
is an **AI-powered web application** with behavior analytics and smart safety monitoring. It tracks appliance and device usage patterns to ensure safe and efficient operation. This is done by combining:

Object detection AI

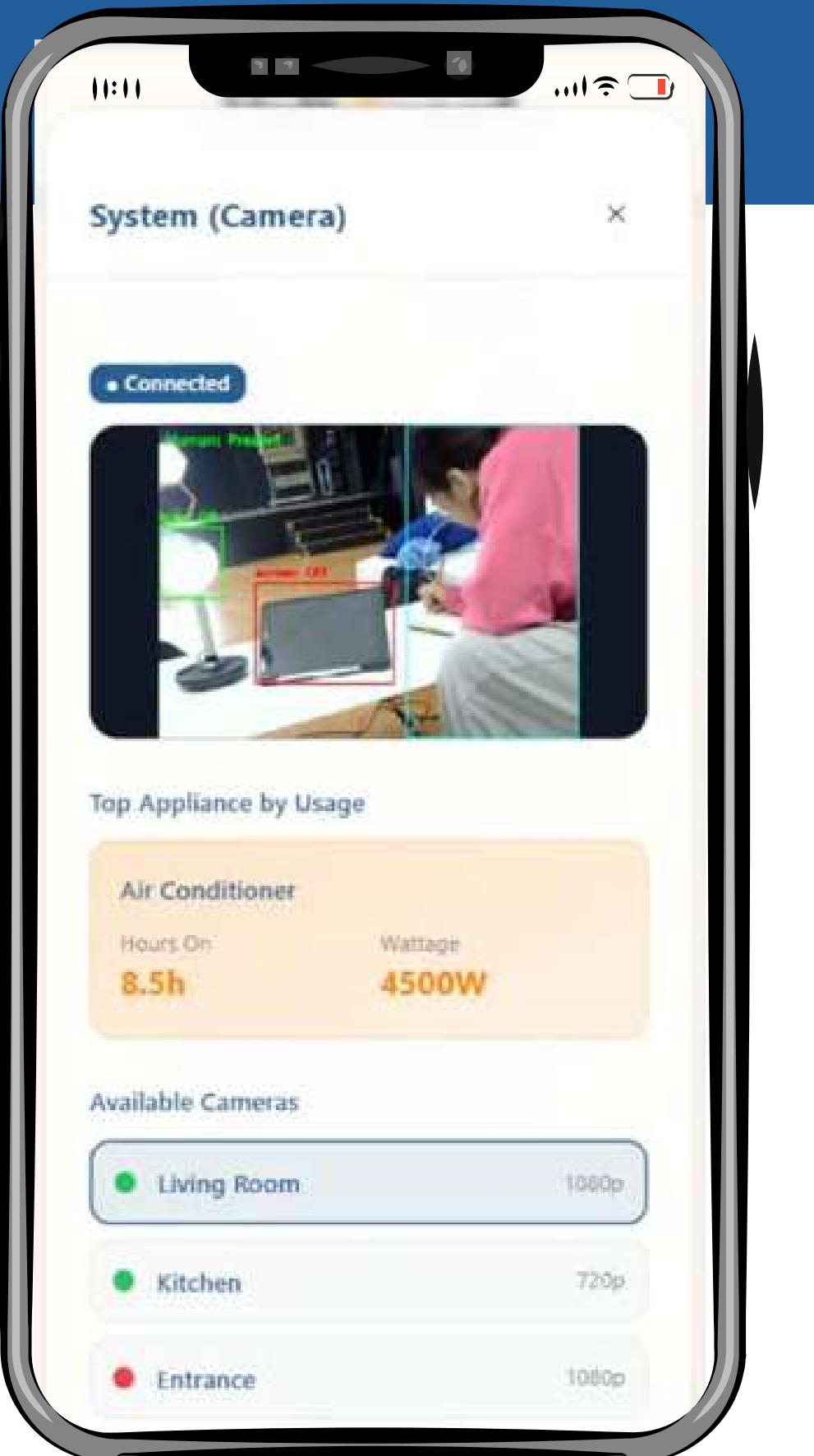
State-of-the-art SLM chatbot



# System Flow



# VoltGuard



- Real-time **Appliance Detection**
- Pop-Up Notifications for **Unattended Appliances**

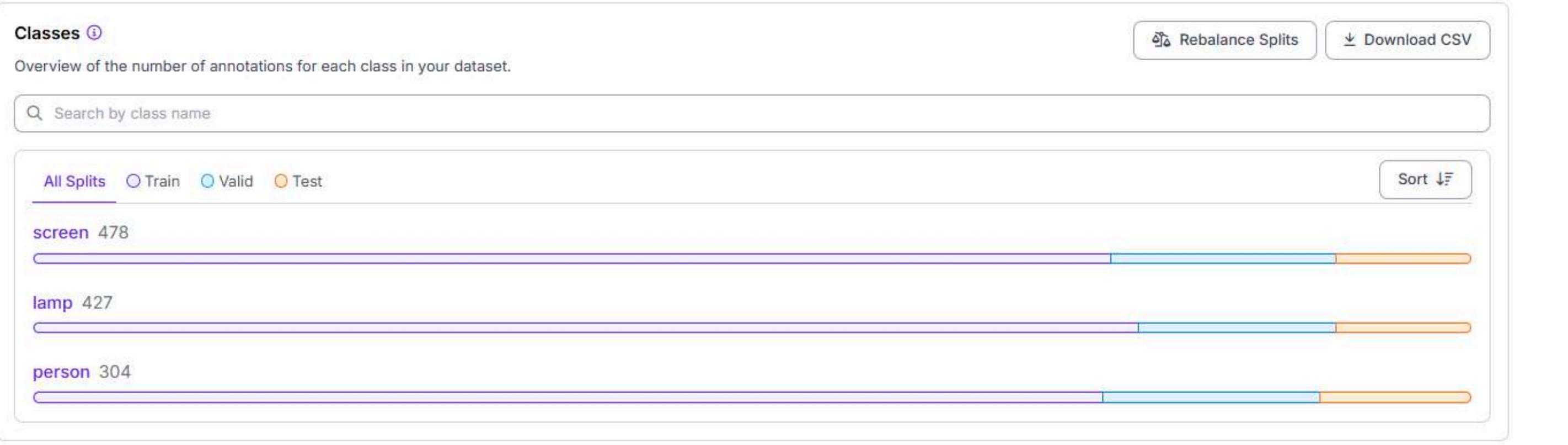
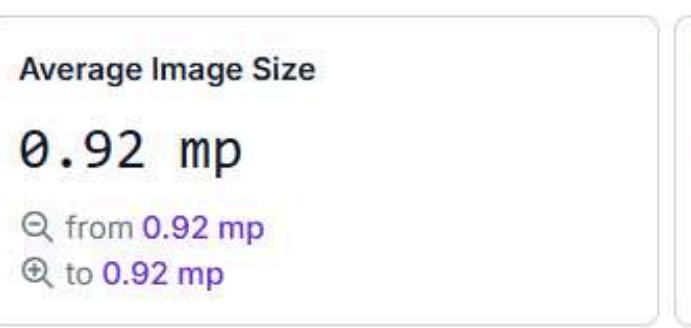


# Computer Vision

## Dataset Analytics

Generated on November 14, 2025 at 7:32 am

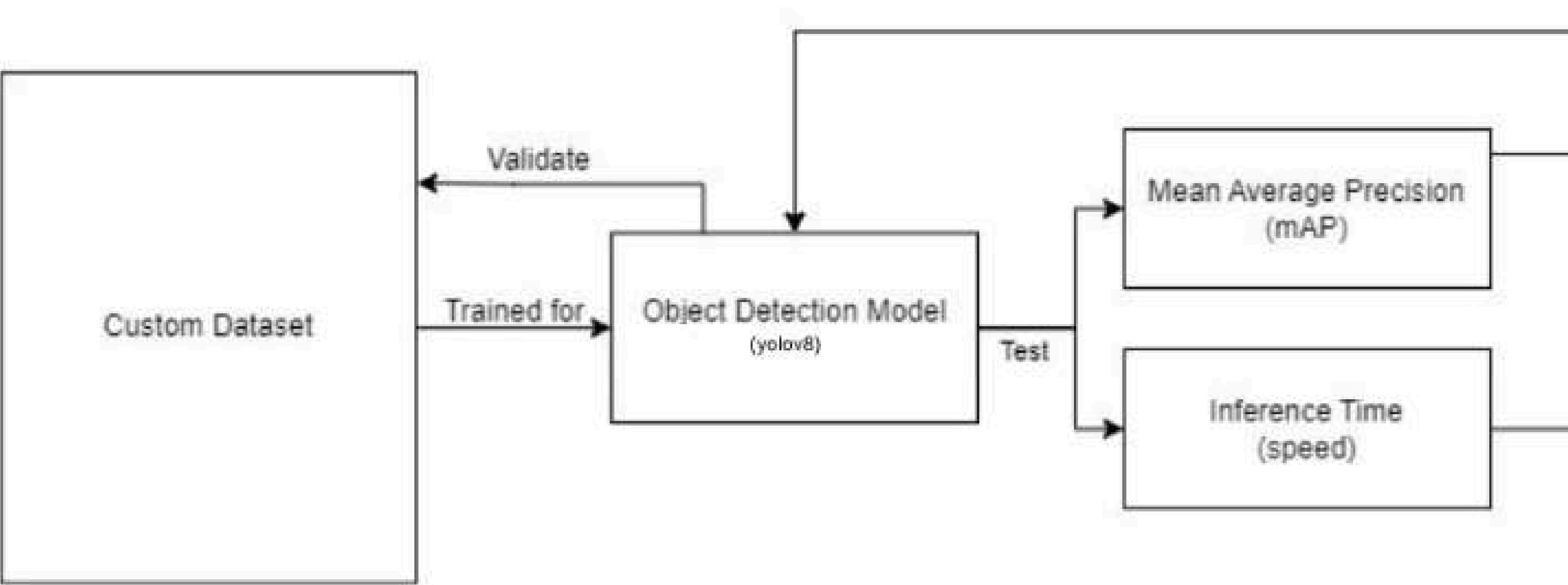
[Regenerate](#)



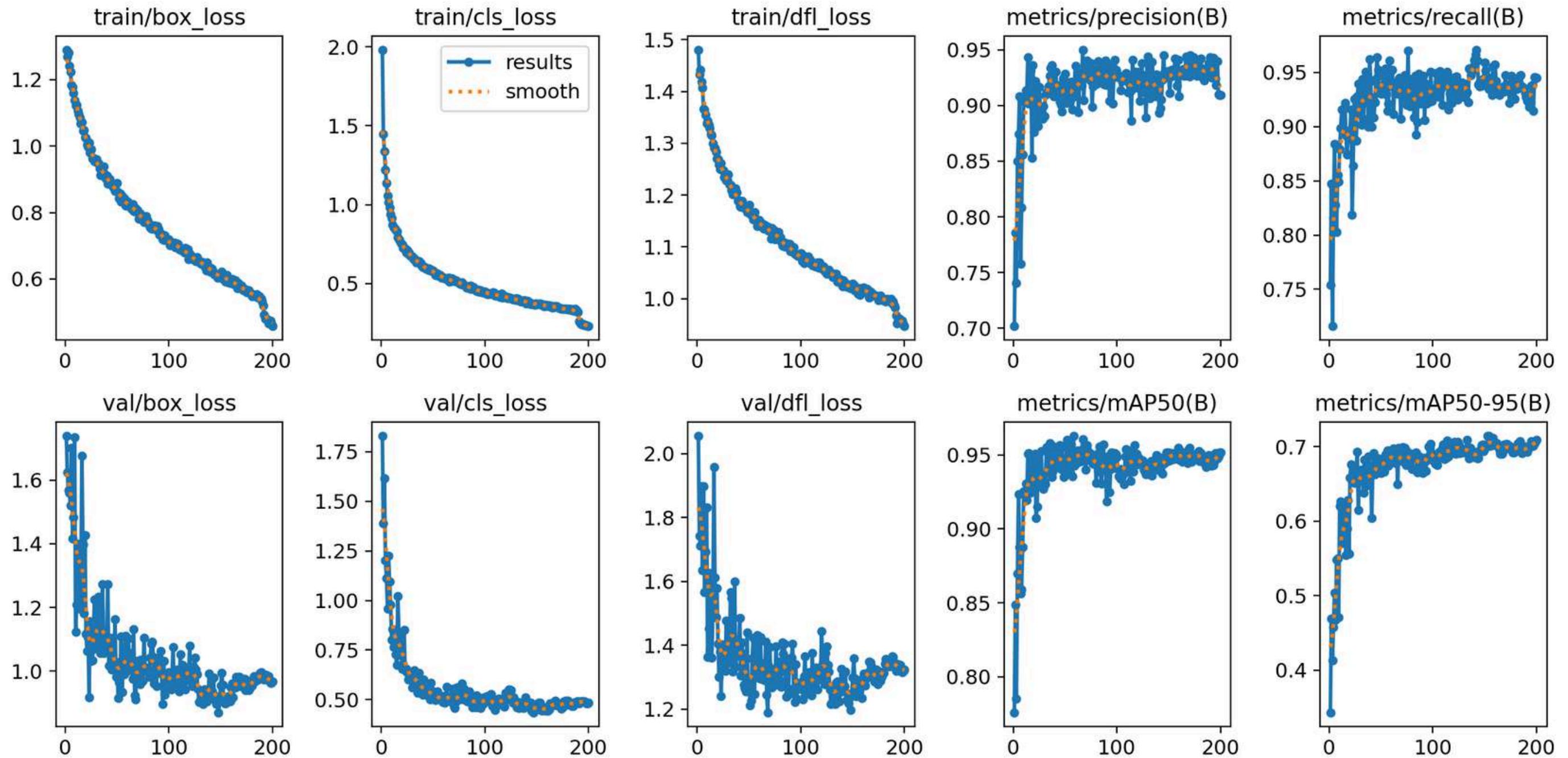
## Dataset



# Computer Vision



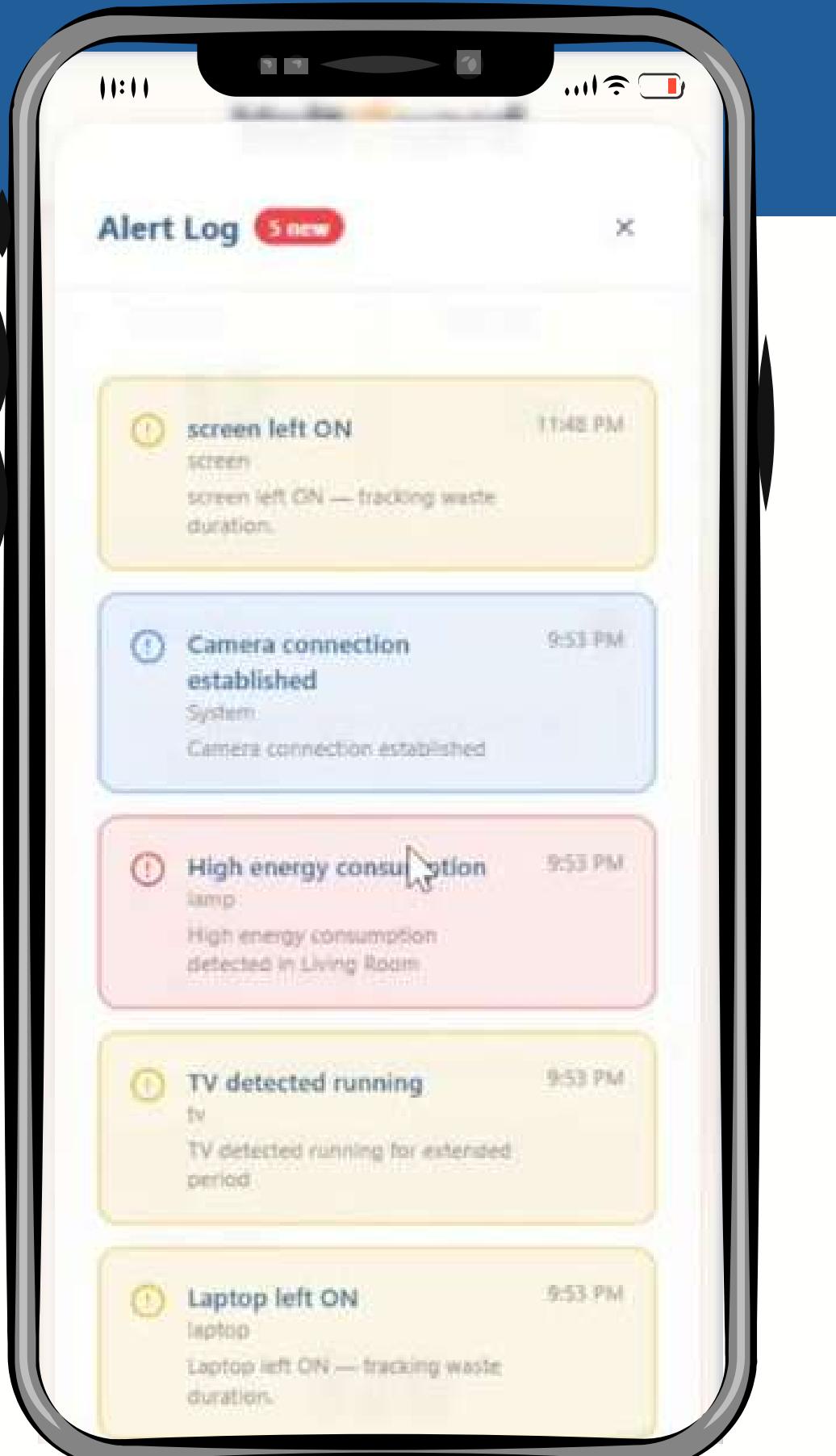
# Computer Vision



- Trained for 300 epochs
- Total training time  $\approx$  2 hours



# Alert Logs



- Pop-Up Notifications for **Unattended Appliances**
- Identify and take action

# Consumption Analytics



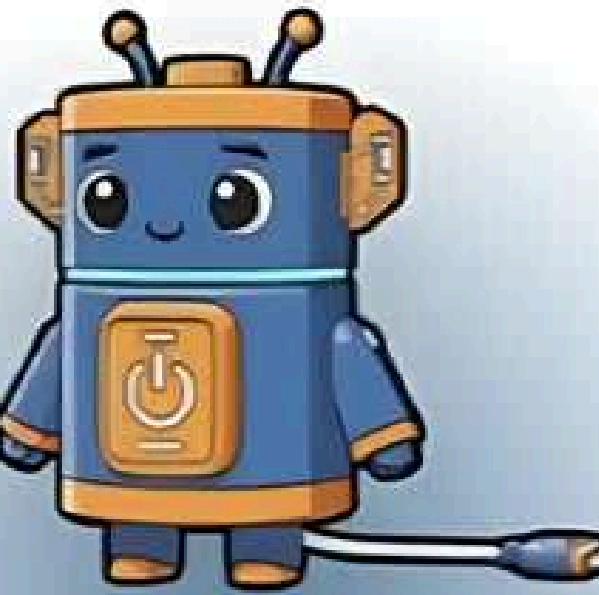
- Shows daily **energy consumption** for the current month through charts.
- Compares current **usage** with the previous month.
- Identifies **peak usage hours** and the top **power-consuming** appliance.
- Helps users understand habits and reduce waste and cost.

10:11



Your Energy Pet

High Performer



High Performer

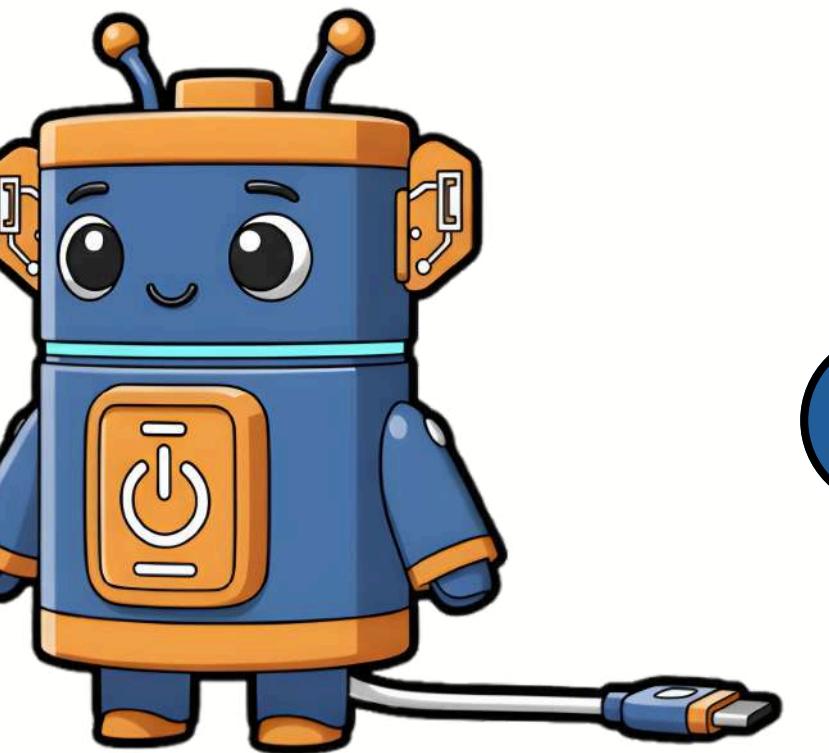
*\*Fully evolved - glowing and animated\**

Tier Progress

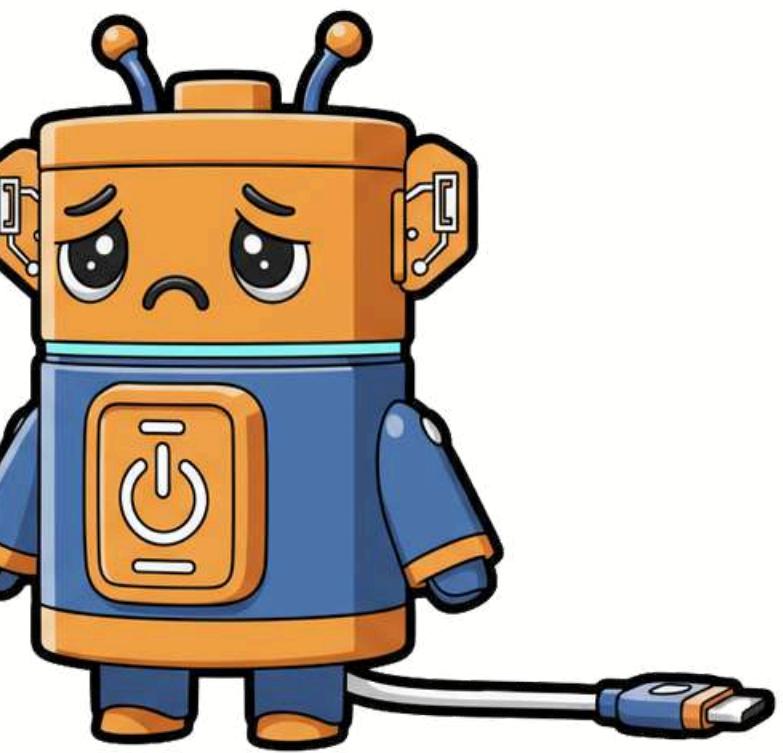
15 days

# Meet Volt!

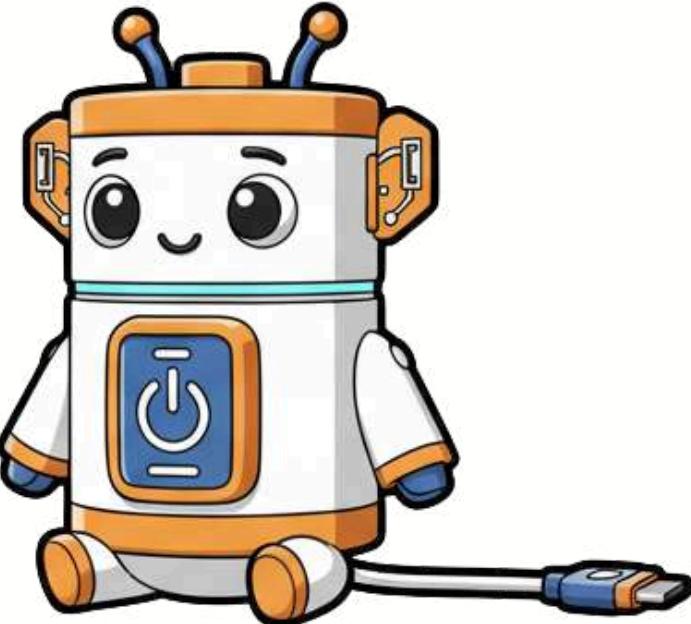
**Volt** is here to help you track how active you've been on our app and cheer you on along the way!



Steady



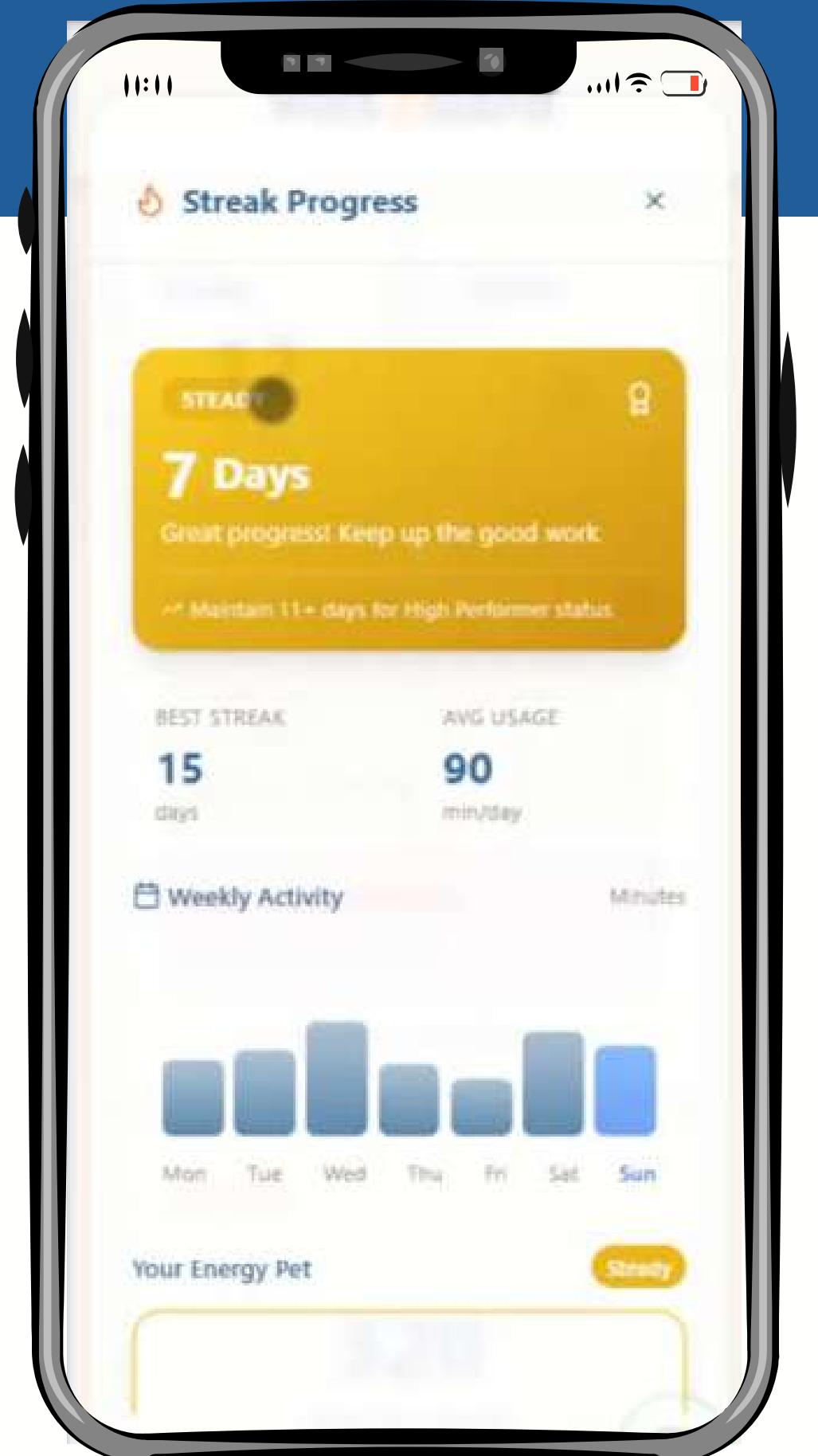
Low



Starter



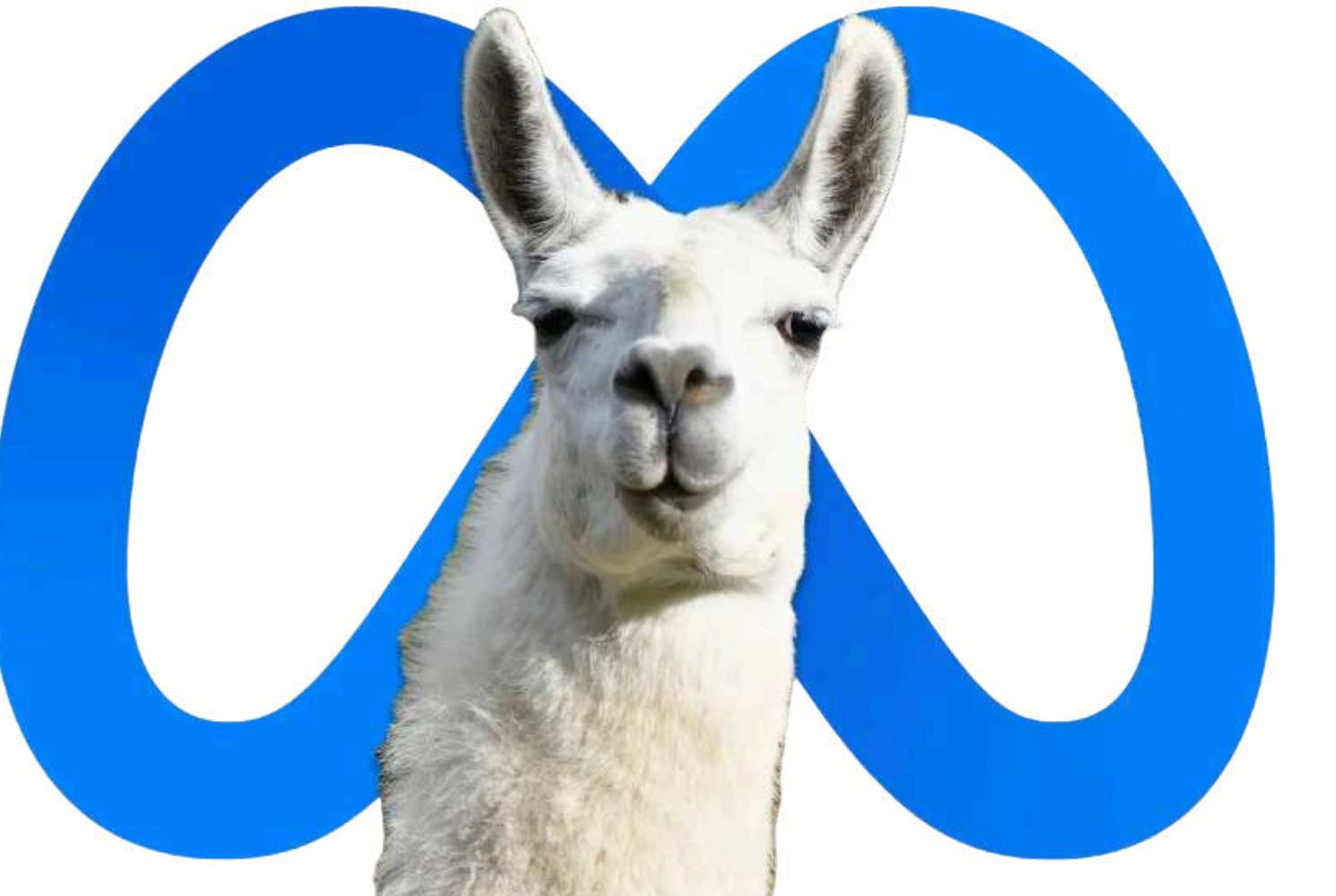
# Volt Streaks



- **Gamified system** that rewards daily app usage.
- Shows **Weekly Activity**.

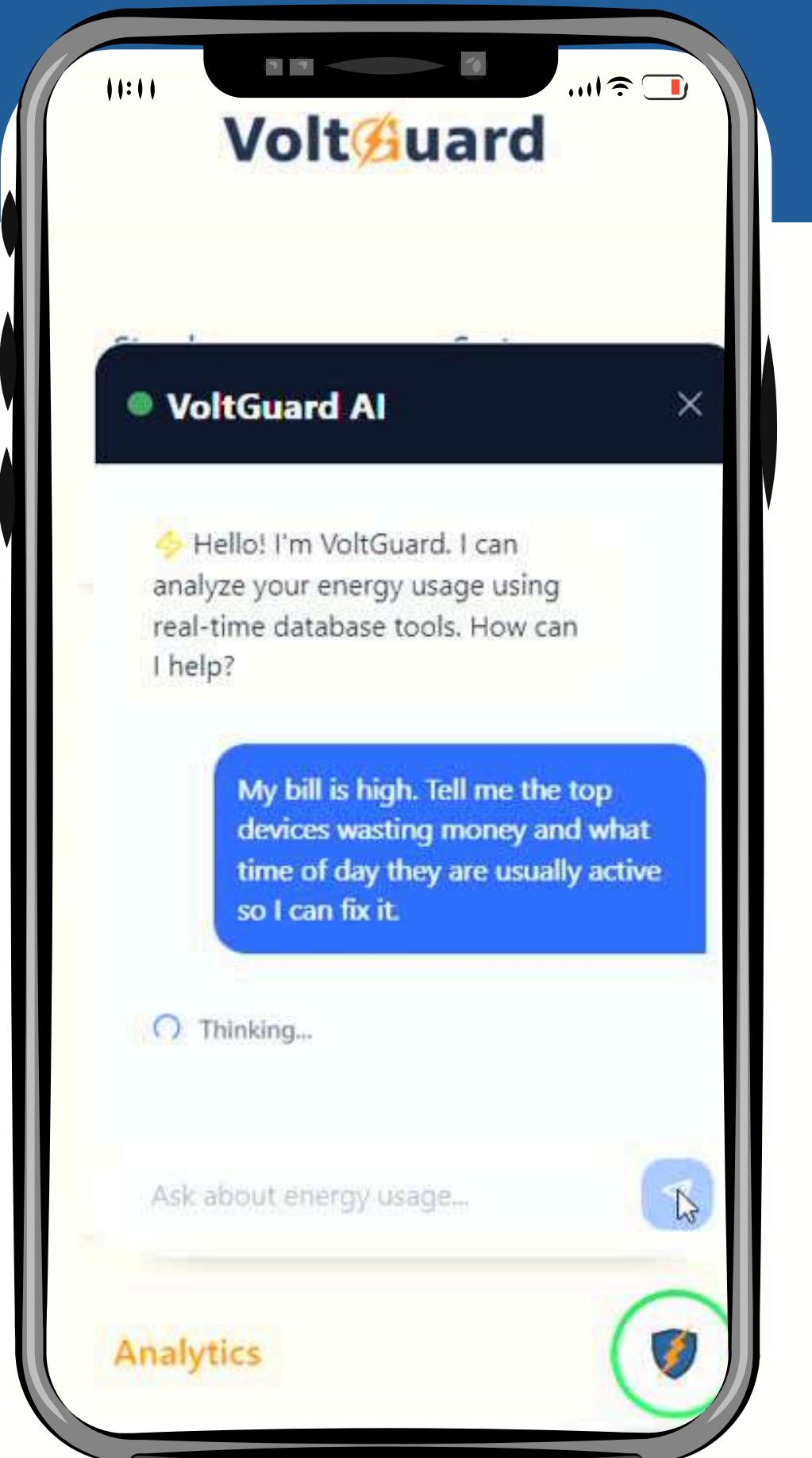


# Chatbot



A **small LLaMA-based language model** that answers questions and provides **descriptive** and **prescriptive insights** about our energy monitoring system.

# Chatbot



- Context-Aware: Understands complex, natural language queries.
- Real-Time Analysis: Fetches live data via MCP (Model Context Protocol).
- Actionable Insights: Converts raw data into specific, money-saving advice.

# Integration to Meralco Infrastructure

The screenshot shows the Meralco Appliance Energy Calculator. At the top, there are navigation links: & Payment, Bright Ideas (with a red lightning bolt icon), News & Advisories, and Help. Below these is a search bar with a placeholder "Enter your average monthly bill amount" and a numeric input field showing "1,000" with a minus sign, "Php", and a plus sign. A dropdown menu titled "Select an appliance" contains "Fluorescent Lamp 21" (20 Watts)" with a magnifying glass icon. A large button labeled "Wattage" with the value "32" is highlighted with a purple border. Below it, a green box contains the question "Hours used per day" and the instruction "How long do you operate the appliance daily?", with the number "1" entered.

Used the **Meralco Appliance Energy Calculator** to estimate appliance consumption and calculate energy loss when devices are left on.

# Alignment

## 12 RESPONSIBLE CONSUMPTION AND PRODUCTION



### SDG 12: Responsible Consumption and Production

- Target 12.2
  - By 2030, achieve the **sustainable management and efficient use of natural resources.**
- Target 12.8
  - By 2030, ensure that people everywhere have the **relevant information and awareness** for sustainable development and lifestyles in harmony with nature.



**volt<sup>g</sup>uard**





where **Safety** and **Savings** meet



# References

- Bureau of Fire Protection. (2020, April). 2020 highlights of accomplishment report. <https://bfp.gov.ph/wp-content/uploads/2022/04/2020-Highlights-of-Accomplishment-Report.pdf>
- Department of Energy. (2018, December 30). E-Power your 2019 energy resolution [Press release]. <https://legacy.doe.gov.ph/press-releases/e-power-your-2019-energy-resolution>
- Meralco. (n.d.). Energy efficiency [FAQ page]. <https://company.meralco.com.ph/faq-about/energy-efficiency>
- United Nations. (n.d.). Goal 12: Ensure sustainable consumption and production patterns. United Nations Sustainable Development Goals. <https://www.un.org/en/academic-impact/sdgsinacademia-goal-12>

