We're developing an IoT device that monitors room lighting and gives users visibility and control from their phone. The goal is for the user to:

- Detect if a light has been on for too long
- Measure energy consumption
- Monitor current light level (lux)
- Remotely turn off or dim the light

These are the items that will be purchased:

Microcontroller

- SparkFun ESP32 Thing Plus (Qwiic) ($28)

Lux Sensors

- Adafruit BH1750 Light Sensor - STEMMA QT / Qwiic($4.50)
- SparkFun VEML7700 (Qwiic) current sensor ($6.95)

Motion Sensor

- Breadboard-friendly Mini PIR Motion Sensor with 3 Pin Header ($3.95)

Current/Energy

- Adafruit INA238 DC Current Voltage Power Monitor - STEMMA QT ($10.95)

Wiring

- Jumper Wires - Connected 6" (M/F, 20 pack) ($2.75)
    - **Purpose**: Non-I²C connections
    - **Used fo**r: PIR sensor, MOSFET gate, 12V wiring
- SparkFun Qwiic Cable Kit (12.95)
    - **Purpose**: Connect I²C sensors easily
    - **Benefits**: no soldering and daisy chain

Light Source

- **12V power supply** ($9.99)
- 12V Flood Light: safer than AC mains, perfect for prototyping
- Logic-level N-MOSFET (ex: IRL520)
    - **Purpose**: Electronic switch/dimmer

- The ESP32: sends PWM signal → MOSFET and MOSFET switches 12V power → light
- **Why needed**: ESP32 can’t drive 600mA directly and MOSFET handles high current safely