

# **Title: Smart Building Management Using IoT**

## **Problem Statement**

Modern buildings often suffer from inefficient energy use, lack of centralized control, and delayed responses to system failures. Traditional building management relies heavily on manual operations, resulting in:

- - Energy wastage
- - Increased operational costs
- - Reduced occupant comfort and safety

## **Target Audience**

### **Primary:**

#### **1. Building Owners & Facility Managers**

- Goal: Reduce energy costs and streamline operations
- Need: Centralized real-time monitoring and control

#### **2. Commercial Property Developers**

- Goal: Increase property value and tenant appeal
- Need: Integrate smart tech into new or existing infrastructure

## **Objectives**

Develop a scalable SBMS that:

1. Monitors real-time data from HVAC, lighting, security, and energy systems

2. Automates control based on occupancy, environmental conditions, and usage patterns
3. Optimizes energy consumption and reduces costs
4. Enhances comfort, safety, and productivity for building occupants

## **Design Thinking Approach**

### **1. Empathize**

Goal: Understand stakeholder needs

#### **Key use concern:**

- Interviews/surveys with facility managers and occupants
- On-site observation of daily operations
- Pain Points Identified
  - High energy bills

### **Define**

Buildings today lack an intelligent, centralized system for monitoring and automating operations such as lighting, HVAC, energy usage, and security.

#### **Key Features Required :**

- Consequences:
  - High energy use
  - Increased costs
  - Reduced comfort/safety
  - Maintenance delays

## **Ideate**

### Potential Solutions

#### Automated Energy Management

Adjust HVAC and lighting based on occupancy and time

#### Predictive Maintenance

Machine learning to predict and alert before system failures

#### Real-Time Security Integration

Smart cameras, motion sensors, and access control in one platform

## **Brainstorming Results**

1. Automated Energy Optimization
2. Predictive Maintenance System
3. Integrated Real-Time Security Monitoring

## **Prototype**

- Real-time IoT monitoring and control
- Cloud-based analytics and automation
- Mobile & Web dashboard for end-users

## **Key Components of Prototype**

- IoT Sensors: Temperature, humidity, occupancy, motion
- Cloud Data Platform: For storage, processing, and analytics

- Interactive Dashboard: For monitoring, control, and reporting

**Test:**

Ensure all components (sensors, dashboard, automation logic) work as intended.

Gather input from facility managers, occupants, and technicians to assess usability and effectiveness.

Test system responsiveness, data accuracy, and cloud processing efficiency under real-world conditions.

Improve or adjust features based on testing outcomes and user suggestions.

**Testing Goal**

- Validate core system functionality
- Collect user feedback from stakeholders
- Identify and fix issues
- Refine features for better usability and performance