**Title:**

**Optimizing Energy Efficiency in Smart Cities Using Edge AI: A Sustainable Approach**

**Objectives:**

To analyze the energy consumption of Edge AI compared to cloud-based AI solutions in smart city applications.

To develop an optimized AI model that reduces power usage while maintaining high accuracy.

To explore renewable energy integration for Edge AI-powered smart city infrastructure.

**Aims:**

The primary aim of this research is to enhance energy efficiency in smart city applications by leveraging Edge AI. Traditional cloud computing solutions require high power consumption due to continuous data transmission. This study aims to explore low-power AI models and energy-aware resource management techniques for sustainable urban computing.

**Methodology:**

**Data Collection:** Analyze energy consumption patterns from real-world smart city IoT devices.

**Implementation:** Deploy AI models on low-power edge computing hardware (e.g., NVIDIA Jetson Nano, Raspberry Pi).

**Performance Evaluation:** Compare Edge AI with cloud-based AI in terms of latency, power usage, and efficiency.

**Optimization:** Develop an AI-driven energy management system that dynamically adjusts workloads based on available power.

**Results (Expected Outcomes):**

* Edge AI can reduce energy consumption by minimizing unnecessary data transmission.
* Optimized AI models can run efficiently on low-power hardware, extending device lifespan.
* Integration of renewable energy sources (e.g., solar-powered edge nodes) can enhance sustainability.
* Smart cities can achieve real-time AI processing with lower environmental impact.

**Conclusion:**

This research demonstrates that Edge AI is a viable solution for building sustainable smart cities. By reducing dependence on cloud computing, cities can lower energy costs, minimize carbon footprints, and improve real-time decision-making. The findings will contribute to future policies for energy-aware AI adoption in urban environments.

**Keywords:**

Edge AI, Green Computing, Smart Cities, Energy Efficiency, IoT, Sustainable AI, Renewable Energy, Low-Power Computing