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Power Generation Using Speed Breaker

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ABSTRACT: This paper explores the concept of utilizing speed breakers as a renewable energy source for controlling street lights. The proposed system harnesses the kinetic energy generated by vehicles passing over speed breakers through a kinetic energy recovery system (KERS). The harvested energy is stored in batteries or capacitors and managed by an energy management system. This system regulates the activation of street lights based on ambient light levels and available stored energy, ensuring efficient utilization of resources. Integration with the local electrical grid allows for excess energy to be distributed to the community during periods of low demand. The design also includes provisions for backup power and remote monitoring and control to ensure continuous operation and optimize performance. By leveraging renewable energy from speed breakers, this innovative approach offers a sustainable solution for street lighting while reducing dependence on fossil fuels and contributing to environmental conservation in urban areas.

I. INTRODUCTION

In urban environments, street lighting plays a critical role in ensuring safety, security, and visibility during nighttime hours. However, traditional street lighting systems often rely on non-renewable energy sources, contributing to carbon emissions and environmental degradation. As the world increasingly seeks sustainable alternatives, innovative approaches to energy generation and utilization have become imperative.

One such approach is the utilization of speed breakers as a renewable energy source for controlling street lights. Speed breakers, commonly found on roads and highways, generate kinetic energy as vehicles pass over them. This kinetic energy can be captured and converted into electrical energy through a kinetic energy recovery system (KERS). By harnessing this energy, it is possible to power street lights in a sustainable manner while minimizing reliance on fossil fuels.

This paper explores the concept of integrating speed breaker energy harvesting systems with street lighting infrastructure. The proposed system aims to optimize energy utilization by intelligently controlling the activation of street lights based on ambient light levels and available stored energy. Additionally, the system includes provisions for grid integration, backup power, and remote monitoring and control to ensure reliability and efficiency. the progress in development by years. Weather forecasting is the prediction of weather conditions for a given location and time through application of science, technology and principles of physics .

1.1. MOTIVATION

1. Sustainability: Traditional street lighting systems often rely on non-renewable energy sources such as fossil fuels, contributing to environmental pollution and climate change. By harnessing renewable energy from speed breakers, cities can reduce their carbon footprint and promote sustainability.
2. Energy Efficiency: Many street lighting systems operate continuously throughout the night, regardless of actual lighting needs. By integrating speed breaker energy harvesting systems with street lights, it becomes possible to optimize energy utilization by activating lights only when necessary, based on ambient light levels and traffic

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conditions.

3. Resource Conservation: Speed breakers are ubiquitous on roads and highways, representing untapped potential for energy generation. By repurposing existing infrastructure to generate electricity, cities can make more efficient use of resources and reduce the need for additional energy infrastructure.
4. Cost Savings: Renewable energy sources such as speed breakers offer the potential for long-term cost savings compared to traditional energy sources. By reducing dependence on grid power and fossil fuels, cities can mitigate the impact of fluctuating energy prices and achieve greater energy independence.
5. Innovation and Technology: The integration of speed breaker energy harvesting systems with street lights represents an innovative application of technology to address urban energy challenges. By embracing technological advancements, cities can demonstrate leadership in sustainability and inspire other communities to follow suit.
6. Community Engagement: Implementing renewable energy projects like speed breaker energy harvesting systems can foster community engagement and awareness around sustainability issues. By involving residents in the transition to cleaner energy sources, cities can build support for broader sustainability initiatives.

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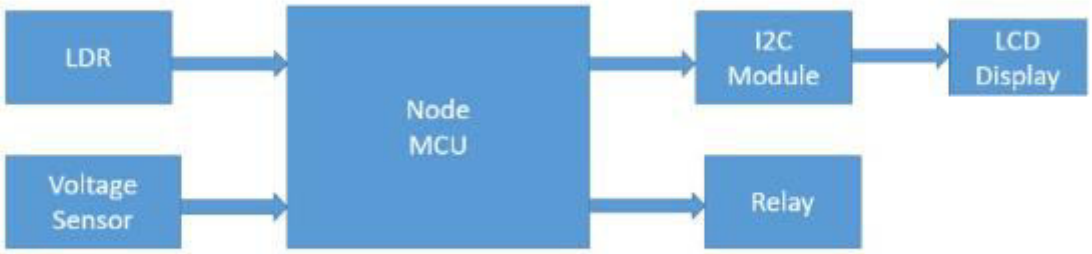
II. PROBLEM STATEMENT

1. Energy Dependency: Urban areas rely heavily on grid power and fossil fuels to meet their street lighting needs. This dependence on non-renewable energy sources contributes to environmental degradation and climate change.
2. Energy Inefficiency: Traditional street lighting systems often operate continuously, regardless of actual lighting requirements. This leads to energy wastage and unnecessary consumption of resources.
3. Limited Sustainability: The lack of sustainable energy solutions for street lighting poses a significant challenge in achieving environmental sustainability goals in urban areas.
4. Underutilization of Resources: Speed breakers, commonly found on roads and highways, represent an underutilized resource for energy generation. Capturing the kinetic energy generated by vehicles passing over speed breakers presents an opportunity to harness renewable energy and reduce reliance on traditional energy sources.
5. Optimization of Energy Utilization: There is a need for innovative approaches to optimize energy utilization in street lighting systems by activating lights only when necessary and based on actual lighting requirements.

III. WORKING



Energy Harvesting: As vehicles pass over the speed breakers installed on roads or highways, the mechanical motion generated by the vehicles' weight and movement is converted into kinetic energy. This energy is captured by a kinetic energy recovery system (KERS) installed within or beneath the speed breakers.

Energy Conversion: The kinetic energy captured by the KERS is converted into electrical energy using various mechanisms such as hydraulic systems, piezoelectric materials, or electromagnetic induction. These systems transform the mechanical motion into electrical current, which can be used to power electronic devices.

Energy Storage: The electrical energy generated by the speed breaker system is then stored in batteries, capacitors, or

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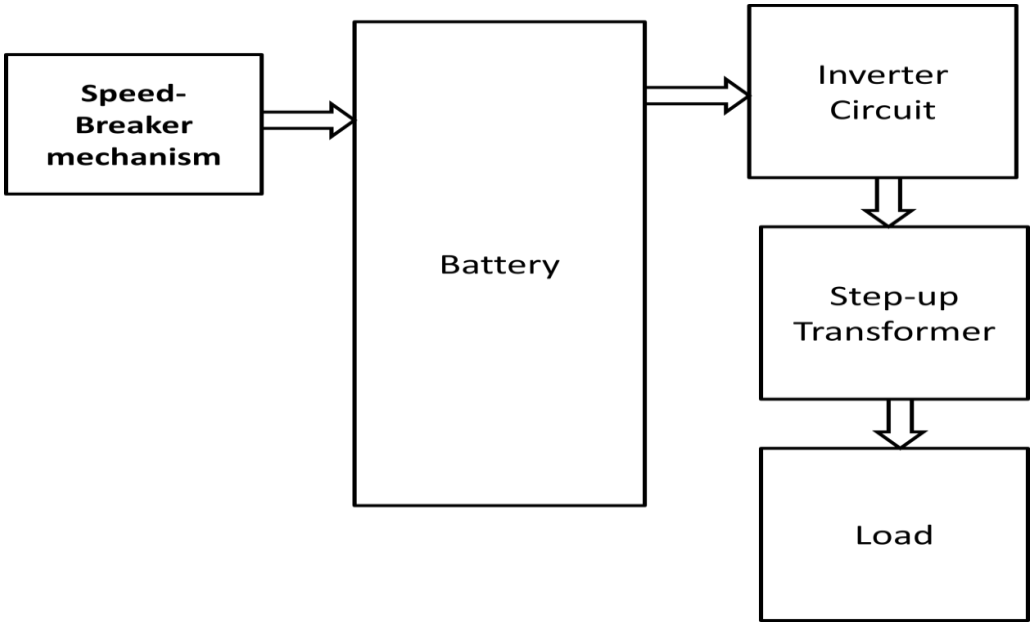
other energy storage devices. This stored energy serves as a reserve for powering street lights during periods of low energy generation or high demand.

Energy Management: An energy management system monitors the stored energy levels, ambient light conditions, and street light requirements. Based on this information, the energy management system decides when to activate or deactivate the street lights, optimizing energy utilization and ensuring that lights are only turned on when needed.

Street Light Control: The energy management system sends signals to the street light control unit, instructing it to either turn the street lights on or off, or adjust their brightness levels. This control unit may be integrated with individual street light fixtures or centralized within a control center.

IV. BLOCK DIAGRAM



Description:

1.Power can be created from routine and nonconventional vitality sources.

2. In this paper we appear vitality transformation from active vitality to rotational vitality and rotational vitality to electrical vitality respectively.

3. Arduino IDE is an open-source electronic stage based on easy-to-use equipment and program. Arduino sheets are able to perused inputs like light on a sensor, a finger set on a button, or a Twitter message.

4. and turn it into an yield to enacting a engine, turn on an Driven, distributing something online. One can tell the board what to do by sending a set of commands/instructions to the micro-controller on the board.

5. To do this, the Arduino programming dialect (based on wiring) and the Arduino program handling based are utilized.

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V. RESULT

Fig:1) Speed Breaker

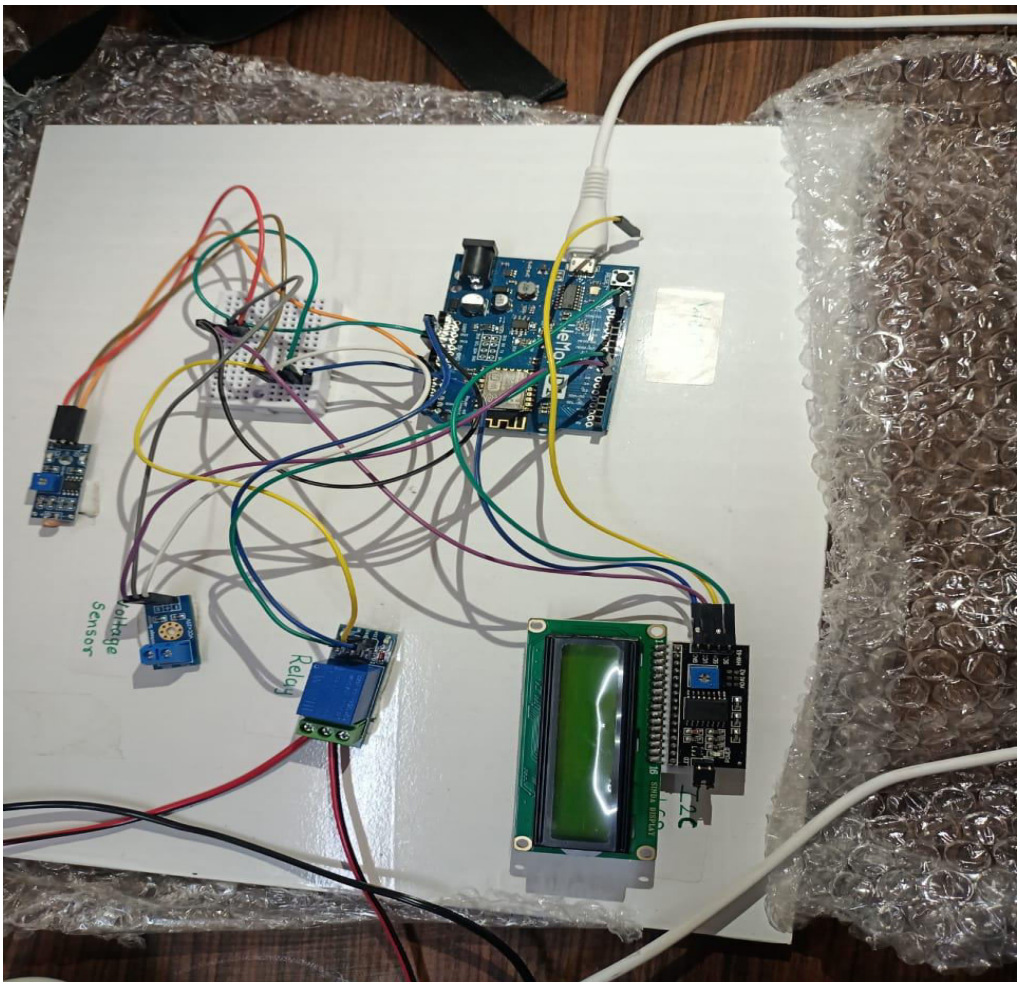

Fig:2) Speed Breaker Light Sensor & Lcd Display

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VI. CONCLUSION

1. Sustainability: By utilizing renewable vitality from speed breakers, cities can contribute to a more maintainable vitality scene and decrease their natural footprint.
2. Energy Productivity: The framework optimizes vitality utilization by enacting road lights as it were when required, based on encompassing light levels and activity conditions, hence minimizing vitality wastage.
3. Resource Preservation: Repurposing existing framework such as speed breakers for vitality era permits cities to make more effective utilize of assets and diminish the require for extra vitality infrastructure.
4. Cost Reserve funds: Renewable vitality sources like speed breakers offer long-term taken a toll investment funds compared to conventional vitality sources, making a difference cities moderate vitality costs and accomplish more prominent monetary sustainability.
5. Innovation and Engagement: Executing imaginative arrangements like speed breaker vitality collecting frameworks cultivates community engagement and mindfulness around supportability issues, driving assist bolster for renewable vitality initiatives.

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