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ELECTRICITY GENERATION BY STRAY ANIMALS

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ABSTRACT:

In this paper authors experimentally studied the animal powered electric generation system for home lighting. Although animals have been using for domestic works at rural and remote areas, but the electricity generation by Animal power is a novel technology. This invention provides animal powered mechanical device for home lighting system. It has unique features of using animal power as prime mover for electric generator. Animal energy in form of high-torque low-speed can be converted into low-torque high-speed through speed increaser to energize the electric generator. The electricity generated is stored in the battery and used when lighting is required either for DC light or AC light using inverter. This equipment is emission free, low cost and has long life. Also, this equipment needs less maintenance and any person can run either skilled or unskilled.

Keywords: Animal-powered electric generation, Home lighting system, Electric generator, Speed increaser, Battery storage,Emission-free,Low-cost,Long life,Maintenance-free,Skilled or unskilled operation

Introduction:

In this paper authors experimentally studied the animal powered electric generation system for home lighting.
Although animals have been using for domestic works at rural and remote areas, but the electricity generation by Animal power is a novel technology.
This invention provides animal powered mechanical device for home lighting system.
It has unique features of using animal power as prime mover for electric generator.
Animal energy in form of high-torque low-speed can be converted into low-torque high-speed through speed increaser to energize the electric generator.
The electricity generated is stored in the battery and used when lighting is required either for DC light or AC light using inverter.
This equipment is emission free, low cost and has long life. Also this equipment needs less maintenance and any person can run either skilled or unskilled.

Methodology:

The Methodology for Electricity Generation by Stray Animals

1. Concept Development

- Identifying stray animals as a potential source of mechanical energy.
- Studying their movement patterns and behaviour to determine feasibility.
- Designing a system that converts animal motion into usable electricity.

2. System Design

- Developing a mechanical setup to harness stray animal movement, such as treadmills or rotary mechanisms.
- Integrating a speed increaser to convert low-speed high-torque motion into high-speed rotation suitable for power generation.
- Connecting the setup to an electric generator.

3. Energy Storage and Utilization

- Incorporating a battery system to store generated electricity.
- Implementing an inverter for AC power conversion.
- Testing various lighting and electrical appliances compatible with the setup.

4. Implementation & Testing

- Deploying the prototype in areas where stray animals frequently move.
- Monitoring energy output and adjusting the mechanical design for efficiency.
- Ensuring safety measures for both animals and the environment.

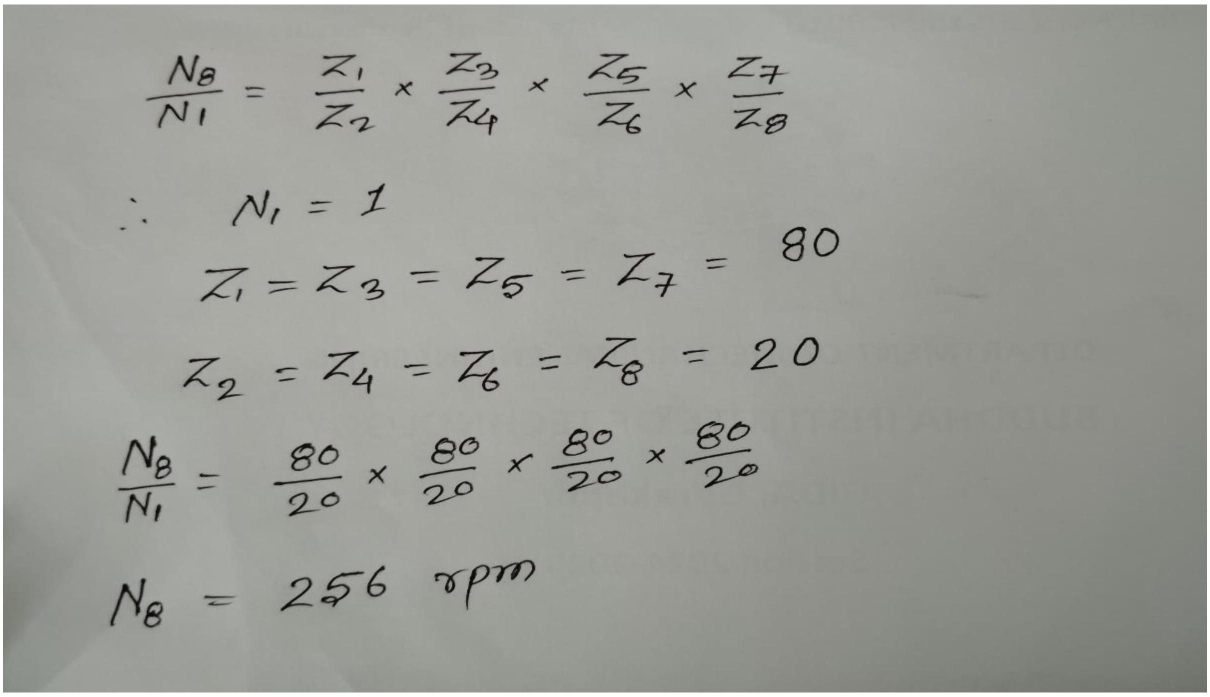
5. Evaluation & Optimization

- Assessing energy generation effectiveness and refining the system.
- Comparing cost-effectiveness against other alternative power sources.
- Exploring scalability for larger implementation in urban settings.

This methodology lays the groundwork for a sustainable and innovative electricity generation approach using stray animal movement. Let me know if you need modifications.

Results

Design Calculation:



Where,

Module of gear is 5.5
Module of pinion is 5.5

Number of gear teeth is 80
Number of pinion teeth is 20

So the calculation of RPM in one rotation is given

Formula – ($N_8/N_1 = Z_1/Z_2 * Z_3/Z_4 * Z_5/Z_6 * Z_7/Z_8$)

(here N= No. of rotation and Z= no. of teeth)

$N_1 = 1$
$Z_1=Z_3=Z_5=Z_7= 80$
$Z_2=Z_4=Z_6=Z_8= 20$

$N_8/1 = 80/20 * 80/20 * 80/20 * 80/20$

N_8 = 256 RPM

<u>Power Output Estimation</u>

A pair of bullocks can produce approximately 500 watts of power. Assuming they work for 4.5 hours, the total energy generated is:
Power (W) × Time (h) = Energy (Wh)
500 W × 4.5 h = *2,250 Wh*
This is equivalent to *2.25 kWh* of energy.

Mechanical to Electrical Conversion

To convert the mechanical energy into electrical energy, a rotary system with an alternator can be used. The mechanical energy from the bullocks is transmitted via a gearbox and pulley system to the alternator.
Assuming an efficiency of 50% for the conversion system:
Electrical Power Output = Mechanical Power × Efficiency
500 W × 0.50 = *250 W*
Therefore, the electrical energy generated in 4.5 hours would be:
250 W × 4.5 h = *1,125 Wh* or ***1.125 kWh.***

Battery Charging

To charge a 12V battery, the energy required depends on the battery capacity. For instance, an 88 Ah battery at 12V requires:
Voltage × Capacity = Energy (Wh)
12 V × 88 Ah = *1,056 Wh*
Thus, the system can fully charge this battery in approximately 4.5 hours, assuming no losses.

Cost Estimation

Operational Costs

The cost of maintaining a pair of bullocks is about ₹150/day during productive periods and ₹100/day during non-productive periods. Krishi Kosh
Assuming 100 productive days per year:
100 days × ₹150/day = ₹15,000/year

Electricity Generation Cost

If the system generates 1.125 kWh per day, the annual energy produced is:
1.125 kWh/day × 100 days = 112.5 kWh/year
Therefore, the cost per kWh is:
₹15,000/year ÷ 112.5 kWh/year = ₹133.33/kWh
This is a simplified estimation and actual costs may vary based on system efficiency, maintenance, and other factors.

Conclusion

Utilizing stray or draft animals for electricity generation is a viable option, especially in rural areas with limited access to conventional power sources. The system can provide sustainable energy for lighting, small appliances, and battery charging. However, considerations regarding animal welfare, system efficiency, and economic feasibility are essential for successful implementation.
Harnessing the power of stray or draft animals for electricity generation is a feasible and cost-effective solution, particularly in rural areas with limited access to conventional power sources. However, careful consideration of animal welfare, infrastructure, and sustainability is essential for successful implementation.

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List all the material used from various sources for making this project proposal

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