PHANTOM LOAD:REAL GHOSTS IN THE MACHINE

NATIONAL SCIENCE FAIR RESEARCH PLAN

LEVEL : MIDDLE LEVEL

CATEGORY : LIFE SCIENCE

SUBMITTED BY

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(GRADE : 8)

(Community Building & Academic Excellence)

PROJECT ID	:	**NSF-SCH-2025-255**
PROJECT TITLE	:	**PHANTOM LOAD:**
		REAL GHOSTS IN THE MACHINE
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SCHOOL.	:	**KH MAT GIRLS HR SEC SCHOOL**
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INTRODUCTION :

The project investigated the hidden electricity consumption known as phantom energy or vampire power. Measurements were taken for common electronic devices such as TV, chargers, and microwaves using a power meter. Results showed that several devices consumed measurable electricity even when turned off but still plugged in. This study emphasizes the importance of unplugging devices when not in use to conserve energy, reduce electricity bills, and promote sustainable living.

Phantom energy refers to the small amount of electricity used by electronic devices even when they are switched off but still plugged in. Devices like televisions, chargers, and gaming consoles often draw power continuously to keep internal circuits, clocks, or standby lights active. The project aims to measure and analyze phantom energy in various devices, increase awareness, and suggest practical ways to reduce unnecessary power loss.

In homes and schools, many devices remain plugged in even when turned off. These devices continue consuming electricity, leading to unnecessary energy waste and higher bills. This project identifies which devices consume the most phantom energy and suggests ways to minimize this hidden energy loss

1. Some electronic devices consume electricity even when turned off but plugged in.
2. Devices with display screens or standby lights will consume more phantom energy.
3. Chargers and entertainment devices will have higher phantom loads than kitchen appliances.

METHODS

Design of Study

Variable Type	Description
Independent Variable	Type of electronic device tested (TV, charger, microwave, etc.)
Dependent Variable	Power consumed in standby mode (watts)
Controlled Variables	Measurement duration, room temperature, and voltage conditions

Procedure :

1.The wattmeter was connected to a power socket.

2.Each device was plugged into the wattmeter one by one.

3.Power readings were recorded when the device was:

Turned on

Turned off but still plugged in

Unplugged

4. Standby power readings were noted in watts.

5. The daily energy consumption in standby mode was calculated using: Energy (Wh) = Power (W) × Hours per day.

6. Yearly energy use was estimated using: Yearly Energy (kWh) = Daily Energy × 365 ÷ 1000.

7. Data were analyzed and represented using bar graphs.

RESULT:

Table 1: Awareness Survey

Participant	Unplug Devices When Not in Use	Knows About Phantom Energy
Person 1	Yes	No
Person 2	No	No
Person 3	Yes	Yes
Person 4	No	No
Person 5	Yes	Yes
Person 6	No	No
Person 7	Yes	No
Person 8	Yes	Yes
Person 9	No	No
Person 10	Yes	Yes

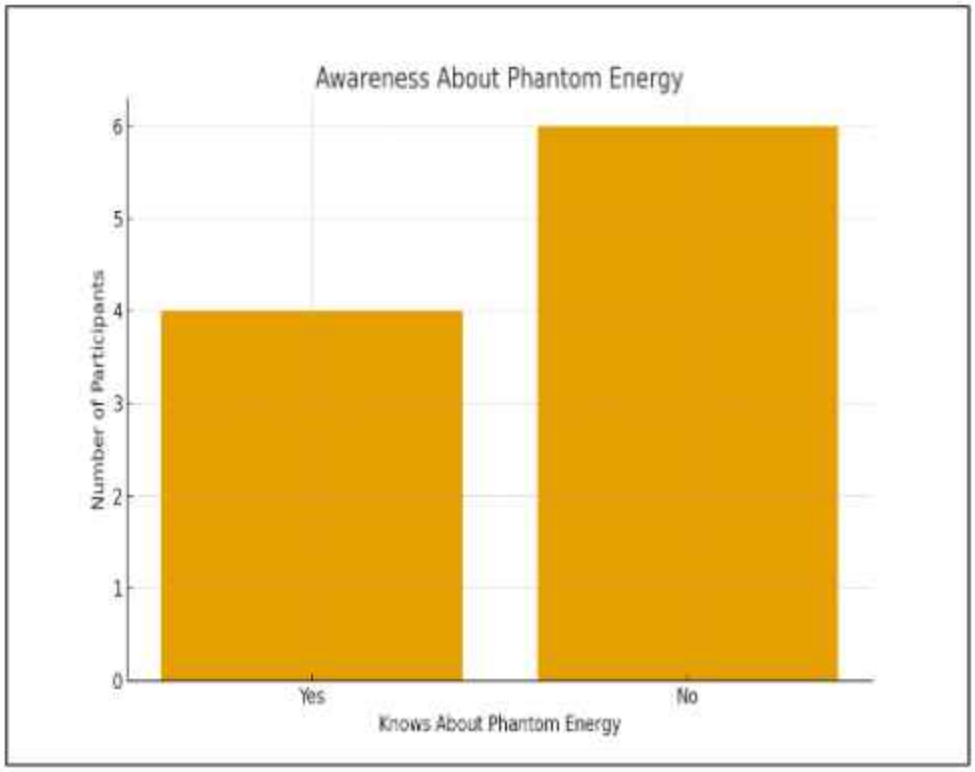
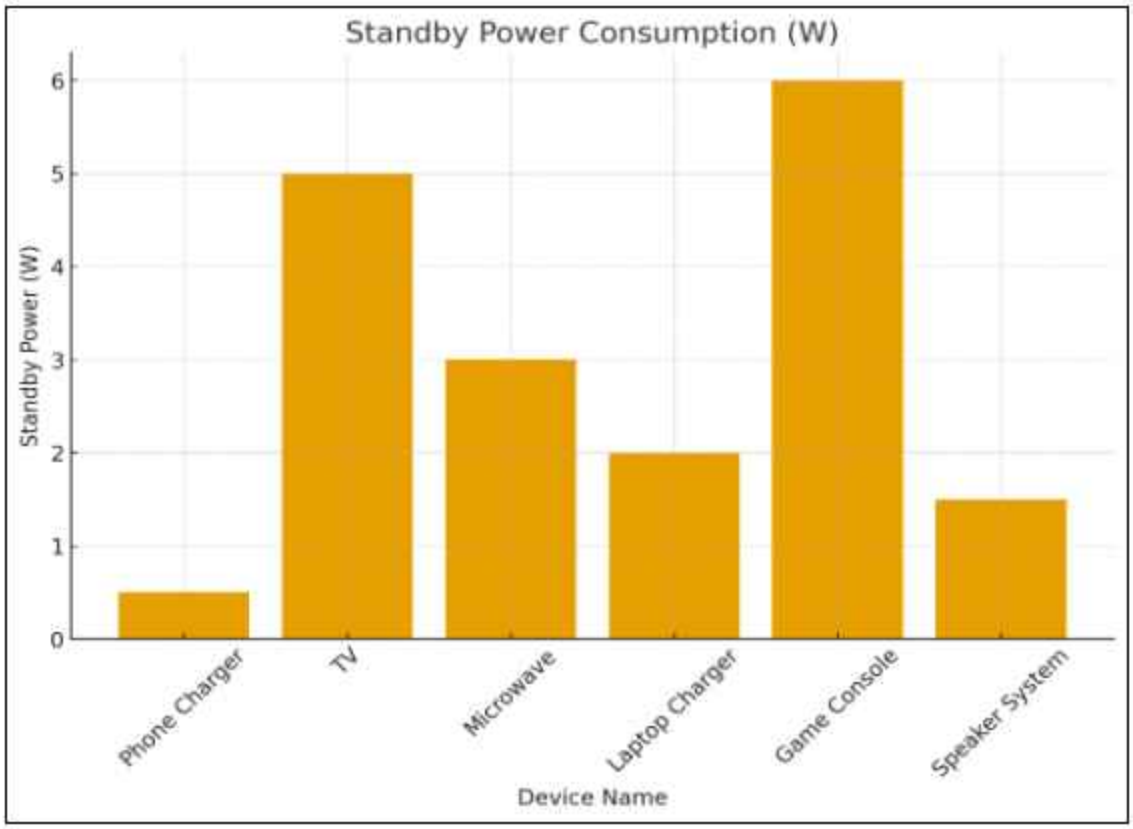


Table 2: Phantom Power Measurement

S.No	Device Name	Power When in Use (W)	Standby Power (W)	Hours in Standby per Day	Daily Energy Use (Wh)	Yearly Energy (kWh)
1	Phone Charger	6	0.5	20	10	3.65
2	TV	120	5	18	90	32.85
3	Microwave	1000	3	24	72	26.28
4	Laptop Charger	65	2	20	40	14.6
5	Game Console	150	6	18	108	39.42
6	Speaker System	50	1.5	20	30	10.95



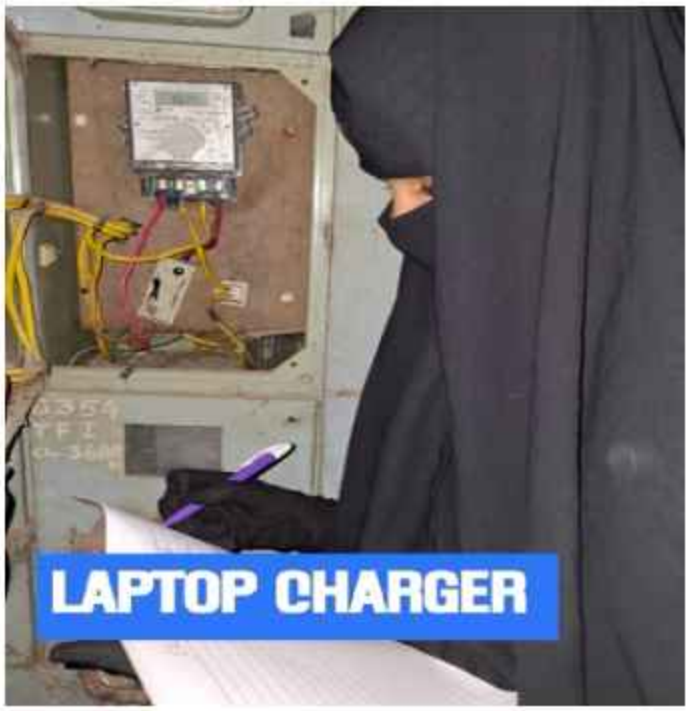

MICROWAVE


SPEAKER
SYSTEM


MICROWAVE


TELEVISION


GAME
CONSOLE


LAPTOP CHARGER


SPEAKER
SYSTEM


PHONE CHARGER

Discussion:

The results showed that all devices tested consumed some amount of phantom power even when switched off. Entertainment devices such as TVs and game consoles had the highest standby consumption due to internal memory and sensors. Simpler devices like chargers and speakers consumed less. The total energy waste per year can add up significantly, showing the importance of unplugging devices when not in use.

Conclusion

The experiment proved that phantom energy is real and contributes to energy wastage. Awareness and small behavioral changes—like unplugging chargers and switching off power strips—can reduce this waste. The application of this study promotes energy conservation, cost savings, and environmental protection.

Future Enhancement

1. Conduct measurements for a larger number of devices across different brands.
2. Test energy-efficient or smart plugs designed to reduce standby power.
3. Develop an automated power cut-off circuit for unused appliances.
4. Spread awareness campaigns in schools and communities.

References

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3. https://belco.bm/energy-efficiency-phantom-energy/