



ELECTRIC AFRICA OFFLINE INVESTIGATION

Renewable Microgrid

S5-S6 | Physics and Engineering | 75-90 minutes

Balance solar, wind, storage and priority demand for a resilient African school.

BEFORE YOU TEST

Predict

Which resource should serve essential loads when clouds reduce solar generation?

SAFETY RULE

Observation and calculation only. Do not open panels, climb roofs or touch solar wiring.



SIMULATION RECORD

Change one variable

Keep all other settings constant. Record a prediction, measurement and observation for each trial.

- 1 Solar and wind generation
- 2 Battery capacity and charge
- 3 Essential and optional demand
- 4 Measure: unmet energy and system cost

INVESTIGATION TABLE

Trial	Variable value	Prediction	Measurement	Observation
1				
2				
3				
4				



HANDS-ON EXTENSION

Build safely

Observation and calculation only. Do not open panels, climb roofs or touch solar wiring.

Materials

- 1 Appliance power labels
- 2 School timetable
- 3 Calculator
- 4 Energy-audit worksheet

Method

- 1 List essential and optional loads.
- 2 Record rated power and hours used.
- 3 Estimate daily energy for each load.
- 4 Propose one demand-saving action and one backup plan.



EXPLAIN AND ASSESS

Turn results into evidence

Explain how generation, storage and priority loads keep the school supplied.

Learner explanation

Teacher rubric - score each criterion 0-4

Observation	Accurate, relevant observations	Score: ____ / 4
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Variable control	One variable changed fairly	Score: ____ / 4
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Evidence	Measurements support the claim	Score: ____ / 4
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Explanation	Scientific reasoning links cause and result	Score: ____ / 4
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Certificate threshold: 12/16 plus independent moderation in the school pilot.