STOP WASTING POWER

ELECTRICAL DIAGNOSTIC INVESTIGATION REPORT

Measured engineering evidence for a large hotel

CLIENT CONFIDENTIAL CLIENT | LARGE HOTEL | ANONYMISED SAMPLE REPORT

Investigation

72-Hour On-Site Electrical Diagnostic Investigation

Prepared by

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REPORT REFERENCE	REPORT DATE	STATUS
SWP-EDI-001 (Sample)	July 2026	Anonymised sample

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Document control

Field	Details
Client	Confidential Client
Site	Large Hotel - location anonymised
Building type	Large hotel
Investigation	72-hour on-site electrical diagnostic investigation
Main incoming monitoring	Approximately 96 hours
Data interval	30 seconds
Prepared by	Alan Maslin AMEI - Stop Wasting Power
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Confidentiality statement

This is an anonymised copy of an electrical diagnostic investigation undertaken for a commercial client. The client's identity, property location and identifying information have been removed. The electrical measurements, observations, analysis, conclusions and recommendations remain representative of the original investigation.

Independence

Stop Wasting Power provides independent engineering advice. It does not manufacture, supply or install equipment, undertake controls modifications, represent manufacturers or receive benefit from recommending a particular technology. Findings are based on measured evidence, physical inspection and commercial assessment in the client’s interests.

ENGINEERING PHILOSOPHY Measure. Diagnose. Recommend. Verify. The purpose is not to identify opportunities to spend money; it is to identify opportunities to save money through informed engineering decisions.

Contents

1. Executive summary

OVERALL CONCLUSION Significant electrical savings remained available despite previous investment in energy-saving technology. The greatest opportunities related to the operation and control of existing engineering systems, not wholesale plant replacement.

Headline opportunity

Measure	Finding
Estimated annual saving	£27,000-£32,000
Indicative electricity-cost reduction	15-20%
Primary opportunity	Plant-room pump and BMS control strategy
Preferred sequence	Operational control and recommissioning before capital replacement
Supply performance	Stable; power factor 0.98-0.99
No-intervention finding	Guest bedroom block responding correctly to demand

Prioritised recommendations

Priority	Area	Recommendation	Annual saving	Cost / payback
1	Plant room	Optimise pump and BMS control strategy	£13,000-£15,000	£4,000-£5,000 / 3-5 months
2	Staff-area lighting	Replace fluorescent fittings and improve control	Approx. £12,000	£8,000-£10,000 / 8-10 months
3	Kitchen plant room	Improve ventilation control strategy	£4,000-£7,000	£1,500-£4,000 / typically <12 months
4	Public-area lighting	Add daylight/time control; retain existing LEDs	£2,000-£5,000	Low / <12 months
No action	Bedroom block	Operating correctly; normal maintenance only	Minimal	N/A

The overall saving is conservative and is not the simple total of every line item because some opportunities may overlap. Values were moderated to reduce the risk of double counting.

2. Scope and methodology

2.1 Purpose

Stop Wasting Power was commissioned to investigate the hotel's electrical consumption and principal engineering systems. The objective was to establish where operating costs could be reduced and unnecessary capital expenditure avoided without compromising guest comfort or operational performance.

2.2 Investigation stages

Stage	Purpose
Measure	Temporary monitoring established how selected systems behaved during occupied and off-peak periods.
Diagnose	Data analysis identified unusual characteristics; physical inspection established why they occurred.
Recommend	Actions were proposed only where evidence showed a commercially worthwhile opportunity.
Verify	Follow-up monitoring is recommended after implementation to confirm performance and savings.

2.3 Activities

- Temporary monitoring of selected distribution boards and engineering systems.
- Analysis of demand at 30-second intervals.
- Comparison of daytime and overnight demand.
- Inspection of plant rooms, engineering systems and selected electrical installations.
- Review of operational control strategies, BMS operation and engineering housekeeping.
- Identification of unnecessary base loads and commercially practical improvements.

2.4 Monitored areas

Main incoming supply; plant/boiler room; kitchen plant room; main hotel distribution board; laundry; bedroom block distribution board; and other engineering services considered appropriate during the investigation.

3. Site and monitoring profile

Attribute	Information
Building use	Large hotel
Normal operation	Survey completed during normal hotel operation without disruption to guests or services.
On-site investigation	72 hours
Main incoming monitoring	Approximately 96 hours
Recording interval	30 seconds
Principal systems reviewed	Incoming supply, VO/PFC, plant-room pumps and BMS, ventilation, lighting, bedrooms, catering and ancillary loads
Commercial objective	Lowest-cost, commercially justifiable response supported by measured evidence

3.1 Monitoring context

The extended incoming-supply record provided a high-level view of daily patterns, peak periods, overnight base load, supply stability, power factor and unusual behaviour. Selected sub-distribution boards were then used to identify which engineering systems were responsible and whether their profiles reflected the hotel's operational demand.

3.2 Interpretation principle

MEASUREMENT BEFORE INVESTMENT An electricity invoice shows how much electricity was used. It does not identify the responsible loads or explain why they operated. Investment decisions should therefore follow measured investigation of the individual building.

4. Main incoming electrical supply

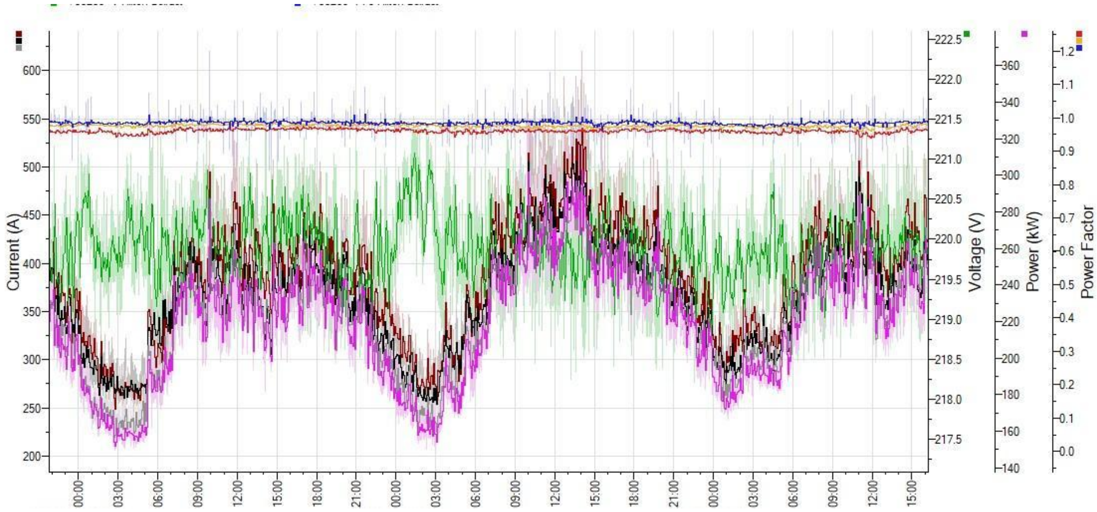

Figure 1 - Main incoming electrical demand and power factor (source monitoring chart).

Date	Off-peak	Peak
Tue 23 May	183.5 kW	249.3 kW
Wed 24 May	149.3 kW	297.2 kW
Thu 25 May	149.8 kW	330.1 kW
Fri 26 May	166.0 kW	310.7 kW

ENGINEERING OBSERVATION Demand reduced overnight, but a substantial base load remained. This showed that significant engineering systems continued operating outside peak occupancy and justified investigation of the principal electrical loads.

4.1 Supply assessment

The electrical supply remained stable and no significant supply abnormality was identified. Power factor remained consistently high. The main incoming record did not itself identify the cause of unnecessary consumption; it directed the investigation towards selected distribution boards and plant systems.

Estimated annual operational carbon associated with the incomer profile: 446.64 tonnes, based on the calculation method used in the original investigation.

5. Voltage optimisation and power factor

5.1 Existing voltage optimiser

The hotel had previously installed a Voltage Optimisation (VO) system. It was found to be operating correctly, with no evidence of equipment malfunction. However, the measured evidence showed that the principal remaining savings did not lie with the incoming supply voltage; materially greater opportunities existed in the operation and control of pumps, ventilation and other engineering plant.

Many significant loads operated through Variable Speed Drives, which electronically regulate the voltage and frequency supplied to motors. Improving the control philosophy governing these systems was therefore likely to produce greater savings than modest incoming-voltage reduction alone.

CONCLUSION The existing VO may continue to provide benefit, but it was not the principal opportunity for further savings. Similar equipment should not be rolled out to other properties without individual measured investigation.

5.2 Power factor

Measured result	Assessment	Recommendation
0.98-0.99 throughout monitoring	Excellent performance; existing correction effective	No additional power-factor-correction expenditure justified

The VO system was providing a clear benefit through effective power-factor correction. No further action was recommended in respect of power factor.

6. Plant room investigation

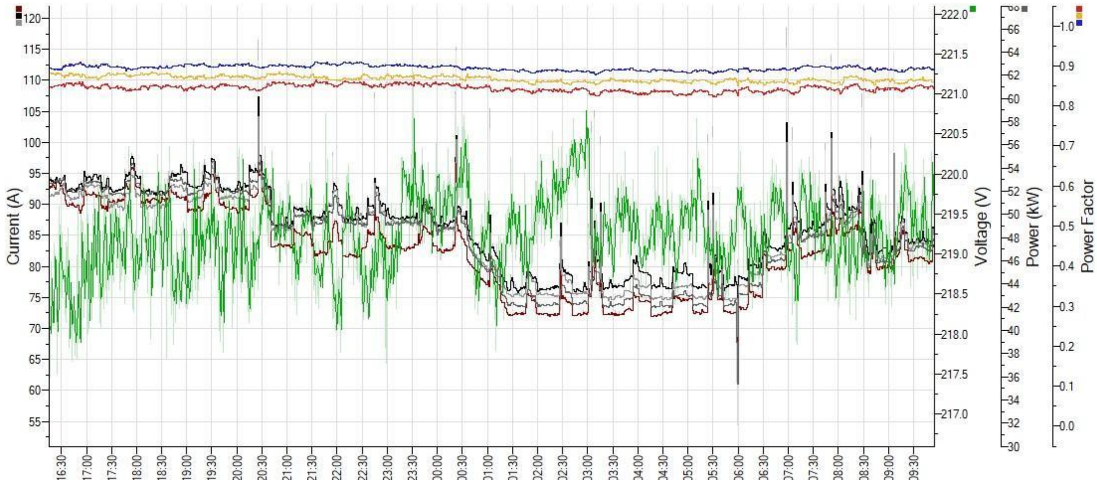

Figure 2 - Plant-room electrical demand profile (source monitoring chart).

Date	Off-peak	Peak
Sat 27 May	47.2 kW	54.8 kW
Sun 28 May	31.8 kW	51.0 kW

MEASURED OBSERVATION Demand reduced only modestly during off-peak periods despite lower hotel demand. Major plant appeared to operate largely independently of actual building requirements. Estimated annual carbon: 108.3 tonnes.

6.1 Engineering assessment

The principal loads were circulation pumps, Variable Speed Drives and associated BMS controls. Pumps appeared suitably sized for maximum design duty and no evidence justified replacement. The VSDs did not appear to have reached end of life, although one drive appeared bypassed and required review. The measured profile indicated that the control strategy no longer reflected varying operational demand.

6.2 Recommended implementation

- Confirm all VSDs operate correctly and investigate the bypassed drive.
- Record current pump parameters and verify associated sensors.
- Review the BMS control philosophy.
- Optimise pump speed against actual heating and hot-water demand.
- Confirm minimum speeds maintain circulation, stability and guest comfort.
- Recommission the revised strategy and re-monitor performance.

6.3 Commercial assessment

Implementation cost	Annual saving	Indicative payback

Implementation cost	Annual saving	Indicative payback
£4,000-£5,000	£13,000-£15,000	Approximately 3-5 months

6.4 Verification

- Confirm reduced overnight electrical demand.
- Confirm pumps respond to changing building demand.
- Verify guest comfort and system performance are maintained.
- Compare the achieved financial benefit with the estimate.

ENGINEERING CONCLUSION The opportunity was one of control, not equipment replacement. Recommissioning the existing strategy offered the strongest commercial return while making full use of the client’s existing investment.

7. Staff-area lighting

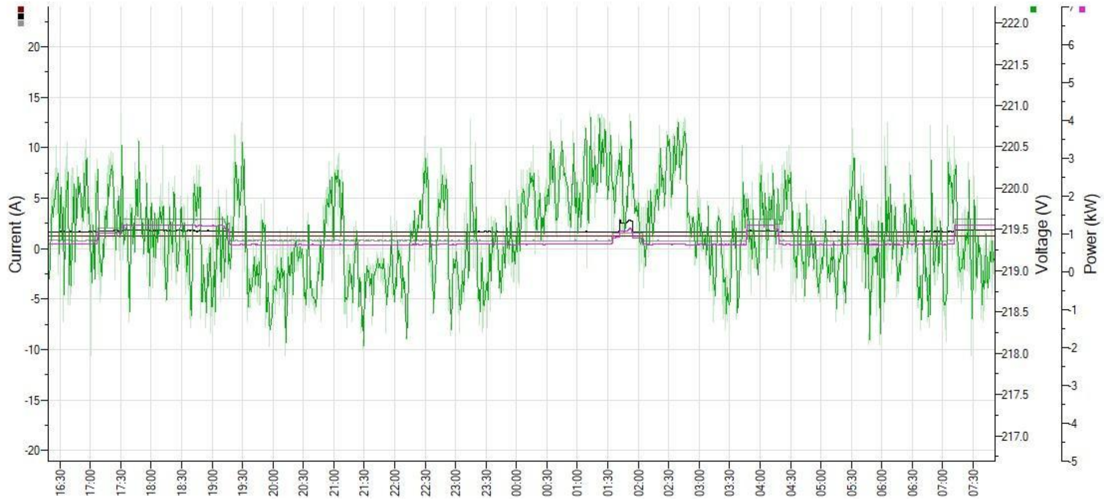

Figure 3 - Staff-area lighting demand (source monitoring chart).

Date	Off-peak	Peak
24 May	0.7 kW	1.2 kW
25 May	0.7 kW	1.2 kW

MEASURED OBSERVATION The small occupied-period increase showed that much of the load remained energised continuously. Inspection found fluorescent lighting in staff, basement and service areas operating for prolonged periods irrespective of occupancy. Estimated annual carbon for the monitored board: 1.8 tonnes.

7.1 Recommended implementation

- Survey and record approximately 80 existing fittings.
- Retain any continuous lighting required for safety, security or emergency purposes.
- Replace appropriate fluorescent fittings with suitable LED equivalents.
- Install occupancy sensors in intermittent-use areas and divide large areas into useful control zones.
- Set suitable delays and verify illumination levels after completion.
- Provide an updated lighting and control schedule.

Implementation cost	Annual saving	Indicative payback
£8,000-£10,000	Approximately £12,000	Approximately 8-10 months

The saving includes reduced electricity and associated maintenance. Final performance depends on replacement wattage, operating hours and the effectiveness of automatic controls.

8. Public-area lighting

8.1 Engineering observation

MEASURED OBSERVATION Reception chandeliers, feature lighting and floor lamps operated through daylight hours despite floor-to-ceiling glazing and substantial natural light.

The existing lamps were already LED. Replacement was not technically justified; unnecessary daytime operation was a control issue.

Recommended response

Review the public-area control strategy. Consider daylight sensing, time scheduling, separate decorative zones and manual override for events. Maintain the presentation and guest experience while preventing unnecessary operation.

Implementation cost	Annual saving	Indicative payback
Low	£2,000-£5,000	Less than 12 months

ENGINEERING CONCLUSION Retain the existing LED fittings. Improve only the operational control so decorative lighting responds to available daylight and hotel requirements.

9. Kitchen plant room

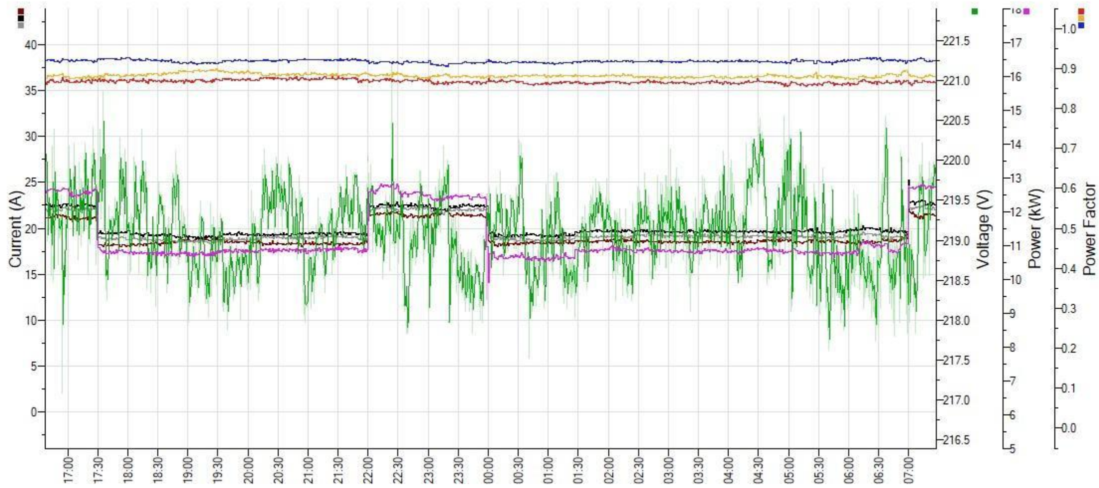

Figure 4 - Kitchen plant-room demand (source monitoring chart).

Date	Off-peak	Peak
25 May	9.0 kW	12.8 kW
26 May	9.0 kW	12.8 kW

MEASURED OBSERVATION Only about 30% of demand fell away outside normal operating hours; about 70% remained overnight on two consecutive periods. The load served kitchen inlet, extract and associated air-handling plant. Estimated annual carbon: 24.2 tonnes.

9.1 Preferred option - programmed time control

Confirm food preparation, cleaning and any overnight room-service requirements. Where continuous operation is unnecessary, install seven-day scheduling to shut down ventilation after kitchen use and restart before breakfast preparation. Include manual override, statutory ventilation, appropriate supply/extract interlocks and recommissioning.

9.2 Alternative - Variable Speed Drives

If genuine operational requirements prevent overnight shutdown, investigate VSD control so ventilation can run at reduced speed during low demand. Suitability depends on motors, mechanical design and operational requirements and requires specialist survey and quotation.

Preferred cost	Annual saving	Payback
£1,500-£4,000	£4,000-£7,000	Typically less than 12 months

9.3 Verification

- Confirm reduced overnight demand.
- Verify satisfactory ventilation operation and required kitchen environmental conditions.
- Confirm statutory and safety requirements remain satisfied.
- Compare achieved savings with the estimate.

ENGINEERING CONCLUSION No evidence supported replacing the ventilation equipment. Automatic shutdown is preferred; VSD control should be considered only if continuous overnight operation is genuinely required.

10. Guest bedroom block

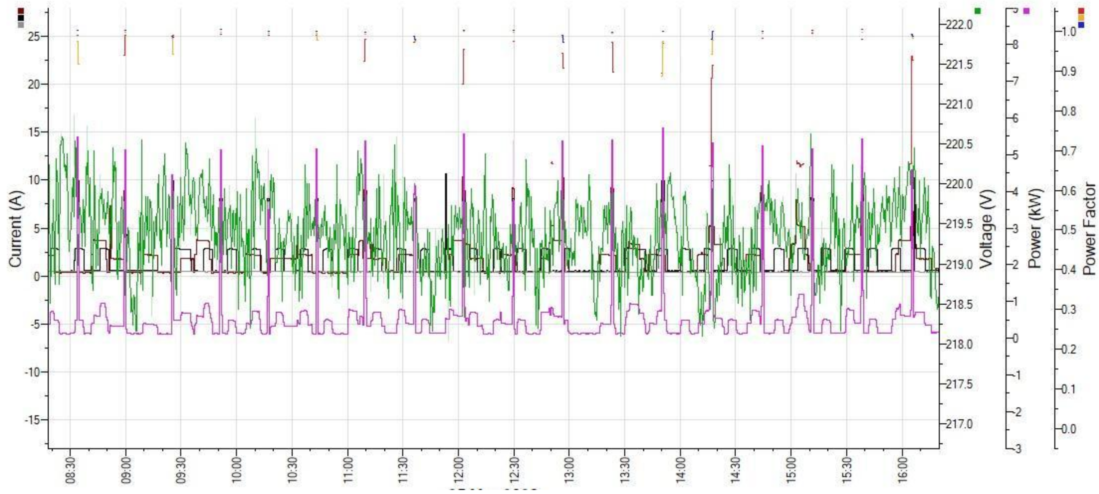

Figure 5 - Guest bedroom block demand (source monitoring chart).

Date	Off-peak	Peak
25 May	0.1 kW	5.7 kW

CONTROL STRATEGY PERFORMING CORRECTLY Demand fell to approximately 0.1 kW off peak and rose only in response to operational demand. Short peaks were consistent with intermittent loads such as lifts or shared services. Estimated annual carbon: 1.2 tonnes.

10.1 Interpretation

The profile broadly reflected occupancy rather than remaining constant through the day and night. This provided a benchmark for demand-responsive operation and contrasted with the plant and kitchen plant rooms.

10.2 Recommendation

NO INTERVENTION REQUIRED No significant additional opportunity was identified. Maintain the existing control philosophy and direct investment towards the higher-return areas identified elsewhere in this report.

11. Future operational considerations

11.1 Guest-room energy management

Bedrooms relied mainly on manual operation by occupants. Measured demand suggested guests generally used facilities responsibly. During future refurbishment, the hotel may consider occupancy-based lighting, automatic HVAC setback, window contacts and control of non-essential sockets, but only where commercially justified and integrated into planned works.

11.2 Catering equipment and asset replacement

Several refrigeration and catering appliances appeared to be original installations; food hot-hold tables were observed operating when not required. Improve operational housekeeping now. Select energy-efficient replacements as equipment reaches end of life, but do not undertake wholesale replacement solely because of age.

11.3 Planned asset-management philosophy

- Optimise existing control systems before replacing equipment.
- Improve operational procedures wherever practical.
- Maintain serviceable plant appropriately.
- Incorporate energy improvements within planned refurbishment.
- Replace equipment only where engineering evidence and commercial justification support it.

PRINCIPLE Maximise the useful life of serviceable equipment while ensuring future investment delivers the greatest operational and financial benefit.

12. Cost and carbon assessment

Ref	Opportunity	Annual saving	Cost	Payback / position
E-01	Plant-room pump and BMS optimisation	£13,000-£15,000	£4,000-£5,000	3-5 months
E-02	Kitchen ventilation programmed control	£4,000-£7,000	£1,500-£4,000	Typically <12 months
E-03	Staff-area LED and controls	Approx. £12,000	£8,000-£10,000	8-10 months
E-04	Public-area daylight/time control	£2,000-£5,000	Low	<12 months
E-05	Bedroom block	Minimal	N/A	No intervention

OVERALL INDICATIVE OPPORTUNITY £27,000-£32,000 per annum, equivalent to an indicative 15-20% reduction in total electricity cost.

The overall opportunity is conservative and not the simple sum of each item. Potential overlap between operational measures was moderated to avoid double counting. A full year of invoices had not been received when the original report was prepared.

12.1 Contracted supply review

When a full year of invoices is available, compare the contracted capacity and capacity-related charges with measured demand. This may identify further opportunity to optimise contracted supply arrangements; no saving is claimed until evidence is reviewed.

12.2 Carbon context

Monitored area	Estimated annual carbon stated in original report
Main incomer	446.64 tonnes
Plant room	108.3 tonnes
Kitchen plant room	24.2 tonnes
Staff-area lighting board	1.8 tonnes
Guest bedroom block	1.2 tonnes

These are load-related carbon estimates from the original report, not additive saving claims. Current reporting should use the client's selected reporting method and a cited carbon factor for the relevant year.

13. Recommendations and action plan

Ref	Action	Priority	Responsible party	Target	Status
E-01	Appoint BMS/controls engineer; inspect bypassed VSD; recommission pump strategy	Immediate	Client / BMS engineer	0-3 months	Open
E-02	Confirm kitchen hours; implement seven-day ventilation scheduling	Immediate	Operations / controls contractor	0-3 months	Open
E-03	Survey 80 fittings; procure LED replacement and occupancy zoning	Short term	Client / electrical contractor	0-6 months	Open
E-04	Review reception decorative lighting and add daylight/time control	Short term	Client / controls contractor	0-6 months	Open
E-05	Retain bedroom controls; normal maintenance only	Monitor	Facilities	Ongoing	No action

13.1 Decision sequence

- Confirm the finding and operating requirement.
- Correct defects, overrides, schedules and setpoints.
- Recommission and verify guest comfort, safety and service.
- Re-monitor the affected load.
- Consider capital replacement only where the remaining evidence justifies it.

14. Measurement and verification

Follow-up electrical monitoring is recommended wherever actions are implemented. Equivalent operating periods should be compared and adjusted for occupancy, weather and operating conditions where material.

Area	Verification evidence	Acceptance criteria
Plant room	Repeat logger profile; BMS trends; pump speed and sensor records	Lower overnight demand; demand-responsive pumps; stable service and guest comfort
Kitchen plant room	Repeat overnight profile; time schedules; override log	Ventilation off or reduced when not required; environmental and safety duties maintained
Staff lighting	Circuit monitoring or operating-hour records; sensor test	Lights off in unoccupied periods; required illumination maintained
Public lighting	Daylight/time schedule review; manual override test	Reduced daylight operation without harming presentation
Bedroom block	No immediate re-test required	Continue demand-responsive operation

14.1 Records to retain

- Pre- and post-change settings and dates.
- Names of responsible engineers and contractors.
- BMS screenshots, logger files and commissioning sheets.
- Comfort, service or operational issues after changes.
- Invoices and cost evidence used to validate commercial benefit.

15. Overall engineering conclusion

The investigation demonstrated that meaningful reductions in electricity use could be achieved without widespread replacement of engineering plant. Temporary monitoring and inspection identified opportunities where better operational control offered greater financial benefit than major capital investment.

The implementation programme should focus first on plant-room pump and BMS optimisation, kitchen ventilation scheduling, lighting control and engineering housekeeping. The bedroom block and existing power-factor correction were found to be operating appropriately and did not justify further intervention.

This approach reduces operating cost and avoids unnecessary capital expenditure while maintaining guest comfort and service. The findings represent Stop Wasting Power's engineering opinion based on the measured data and observations available during the investigation. Follow-up monitoring should verify the benefits of implemented actions.

> **FINAL POSITION** Measurement identified where electricity was consumed. Engineering investigation established why. Recommendations were limited to actions with practical and commercial justification.

Prepared by

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Appendix A - Monitoring evidence

The following measured peak/off-peak results are reproduced from the anonymised sample investigation. Original monitoring charts are included within the relevant report sections.

Area	Date	Off-peak	Peak	Finding
Main incomer	23 May	183.5 kW	249.3 kW	Substantial base load
Main incomer	24 May	149.3 kW	297.2 kW	Substantial base load
Main incomer	25 May	149.8 kW	330.1 kW	Highest recorded peak
Main incomer	26 May	166.0 kW	310.7 kW	Substantial base load
Plant room	27 May	47.2 kW	54.8 kW	Weak demand response
Plant room	28 May	31.8 kW	51.0 kW	Weak demand response
Staff lighting	24 May	0.7 kW	1.2 kW	Continuous load
Staff lighting	25 May	0.7 kW	1.2 kW	Continuous load
Kitchen plant	25 May	9.0 kW	12.8 kW	~70% remained overnight
Kitchen plant	26 May	9.0 kW	12.8 kW	Repeated pattern
Bedroom block	25 May	0.1 kW	5.7 kW	Correct demand response

Appendix B - Assumptions and limitations

This report is an anonymised sample and reflects the data, access and operating conditions available during the original investigation. Short-term monitoring does not represent every season or exceptional event. Cost estimates are indicative and require quotations. Savings are not guaranteed and must be verified after implementation. Recommendations affecting electrical, mechanical, ventilation, life-safety or BMS systems must be reviewed and delivered by appropriately qualified persons.