

CONFIDENTIAL EXECUTIVE MEMORANDUM

TO: Board of Directors, Mall of Zimbabwe (WestProp Holdings)
FROM: Lead Data Scientist & Energy Strategy Team
DATE: December 19, 2025
SUBJECT: Pre-Construction Lifecycle Cost Analysis

1. EXECUTIVE SUMMARY (THE 'SMART MALL' INITIATIVE)

In preparation for the 2026 construction phase, we have conducted a comprehensive Lifecycle Cost Analysis (LCCA) to forecast the Mall's operational energy demand.

Our AI simulation projects an annual base load of 25.9 Million kWh, representing an OpEx liability of \$3.63 Million per year.

We have identified a verified savings potential of \$1.66 Million (45.8%) by integrating a 4MW Solar Microgrid and AI-driven BMS controls into the design.

2. OPERATIONAL BASELINE (SIMULATED DIGITAL TWIN)

- Annual Energy Demand: 25,912,195 kWh
- Peak Power Demand: 14,650 kW
- Energy Intensity: 288 kWh/m²/year (Optimized vs SA Avg)
- Grid Resilience: Model accounts for 6% grid failure rate (ZESA Load Shedding)

3. AI MODELING VALIDATION

To ensure financial accuracy, we benchmarked multiple AI forecasting models. The XGBoost (Gradient Boosting) model proved superior for Zimbabwe's volatile grid.

Winning Model: XGBoost (97.9% Accuracy)

Defeated Models: Prophet (Failed on outliers), LSTM (Slower adaptation)

Mean Error: +/- 66 kWh per hour

4. STRATEGIC INVESTMENT PLAN (CAPEX RECOMMENDATIONS)

INITIATIVE 1: ROOFTOP SOLAR (4MW)

- Annual Savings: \$1,124,200
- Payback Period: 4.5 Years
- Implementation: Include 4MW solar spec in architectural roof design.

INITIATIVE 2: AI HVAC OPTIMIZATION

- Annual Savings: \$182,836
- Payback Period: 0.8 Years
- Implementation: Specify AI-compatible BMS sensors in MEP tender.

INITIATIVE 3: LED RETROFIT

- Annual Savings: \$355,515
- Payback Period: 1.5 Years

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- Implementation: Mandate LED-only fixtures in tenant guidelines.

5. FINANCIAL PROJECTION (10-YEAR OUTLOOK)

Metric	Standard Build	Smart Mall Build
Annual Bill	\$3,627,707	\$1,965,156
10-Year OpEx	\$36,277,073	\$19,651,555
Net 10-Year Savings	-	\$16,625,518

RECOMMENDATION: ADOPT 'SMART MALL' SPECIFICATIONS FOR TENDER.