

NFE Commercial Reliable Power Microgrids

Commercial Reliable Power Microgrids (RPMs)

Phase 2 financial and bankability model | Worship Harvest worked example

STATUS Team Review Draft	VERSION 0.1	DATE 18 Sep 2026
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Core proposition

NFE sells reliable electricity as a service at approximately the customer's applicable utility tariff. The customer pays for energy used, not equipment. NFE owns, operates, maintains and replaces the reliability infrastructure, with an optional Phase 4 path to ownership.

1. Purpose of this document

This pack is intended to support the NFE weekly team review on the emerging Commercial RPM model. It captures the current product logic, a worked Phase 2 case, preliminary financing structure, customer-screening thresholds, model definitions and the decisions still required before NFE treats the model as investment-ready.

- **Reference customer:** Worship Harvest Ministries, using customer-supplied UEDCL bills and account movements.
- **Benchmark:** Sawa Energy's Bellavista solar + battery lease-to-own proposal was used as a commercial-structuring reference, not as NFE's pricing model.
- **Status:** Pre-feasibility / internal investment model. Site metering, EPC quotations, regulatory confirmation and credit underwriting remain required.

2. The Commercial RPM model

Phase	Customer outcome	NFE activity
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1 - Measure & Manage	Establish an evidence-based load and outage baseline.	Install interval metering, characterize peak/shoulder/off-peak demand, identify critical loads and quantify current backup costs.
2 - Reliable Power	At least the contracted critical load remains powered through normal outages.	Deploy storage, inverter/control infrastructure and enough PV to help finance the reliability layer.
3 - Energy Optimization	Lower grid dependence and optimize energy cost/reliability.	Expand PV/storage, optimize dispatch and progressively use the grid as a secondary source.
4 - Ownership Option	Customer may choose to acquire the installed system.	Execute a predefined buyout/transfer mechanism that first protects any outstanding lender obligations.

3. Worship Harvest: current evidence base

Metric	Working value	How to treat it
Average monthly electricity consumption	~6.9 MWh/month	Derived from four supplied detailed UEDCL bills; use as the current baseline, not a guaranteed future load.
Annualized electricity consumption	~82.9 MWh/year	Used for the current screening model.
Observed load mix	~29% peak / 52% shoulder / 19% off-peak	Useful because the 18:00-24:00 peak period exactly matches the requested six-hour backup window.
Recent utility payment behavior	Bills in the supplied statement were substantially/fully cleared within the billing cycles shown.	Positive early credit signal, but not a substitute for full credit underwriting.
Phase 2 reliability target	At least 6 hours during 18:00-24:00	Must be validated with interval data and critical-load definition.

4. Preliminary Phase 2 technical design

Component	Working design	Rationale
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LFP battery	120 kWh nominal	Provides headroom above historical average peak-period energy, plus usable-depth, conversion-loss and reliability reserve allowances.
Hybrid inverter	50 kW, three-phase	Provides headroom for instantaneous demand and motor/other transient loads that monthly bills cannot reveal.
Solar PV	36-40 kWp preferred	PV is not needed to make a 6-hour evening battery work technically; it is included because avoided daytime/peak grid purchases finance the reliability infrastructure.
Controls / EMS	NFE Microgrid OS + metering	Required for dispatch, monitoring, billing, alarms, asset health and later portfolio management.

Important engineering caveat

Monthly bills show energy consumption, not instantaneous power demand. The 50 kW inverter and 120 kWh battery are preliminary. Phase 1 interval metering should validate the maximum kW demand, critical-load profile, event-day behavior, battery charge window and site power quality before procurement.

5. Commercial model: where the RPM margin comes from

The RPM margin is not a surcharge on the customer tariff. It is the economic spread created when NFE can supply a portion of the customer's electricity at a lower effective cost than the utility tariff while preserving the customer-facing price anchor.

Cash-flow layer	Illustrative annual value	Meaning
Customer electricity revenue	~UGX 47.0m	Energy sold at the utility-equivalent weighted tariff assumption.
Gross avoided utility purchases	~UGX 34.8m	Value created by direct PV plus PV shifted through storage to displace grid purchases.
Routine O&M allowance	~UGX 2.1m	Annual operating/maintenance budget.
Battery + inverter lifecycle reserve	~UGX 6.9m	Explicit reserve contribution for major component replacement rather than assuming these costs disappear.

Cash-flow layer	Illustrative annual value	Meaning
NFE monitoring/billing/site overhead	~UGX 1.2m	Site-level software, monitoring, billing and operating support allowance.
CFADS (internal screening definition)	~UGX 24.5m	Cash flow available for debt service after the above conservative operating and reserve provisions, before debt service.

6. Base-case bankability structure

Item	Working assumption
Installed Phase 2 CAPEX	~UGX 143m
Customer contract term	15 years
Senior debt	50-55% of CAPEX preferred for early projects
Sponsor / investor equity	45-50% of CAPEX
Target debt tenor	10 years minimum
Target UGX debt rate	<=12% if possible; concessional/project finance preferred
Debt Service Reserve Account (DSRA)	6 months of scheduled debt service
Customer upfront equipment payment	Zero
Customer tariff	Utility-equivalent energy tariff, with contractually defined indexation
Ownership	NFE/SPV during service term; Phase 4 buyout option subject to lender discharge

7. Illustrative 55% debt case

Metric	Illustrative result	Interpretation
Senior debt	~UGX 78.5m	55% of ~UGX 142.8m CAPEX.
NFE/investor equity	~UGX 64.3m	Before DSRA funding.
Annual debt service	~UGX 13.9m	Assumes 12% debt over 10 years with level annual debt service.

Metric	Illustrative result	Interpretation
Base DSCR	~1.76x	CFADS / scheduled debt service. Provides material cushion above 1.0x.
6-month DSRA	~UGX 7.0m	Liquidity buffer equal to half a year of scheduled debt service.
Unlevered project IRR	~15.1%	Return on the project before debt financing, under the current simplified 15-year constant-real-cash-flow assumptions.
Equity IRR	~15.6-16.0%	Approximate result depending on how/when DSRA is released.

Financing conclusion

The economics are much more attractive with long-tenor concessional or project debt than with ordinary high-cost commercial lending. Early RPMs should prioritize lower leverage and strong coverage rather than maximizing debt. Portfolio financing can increase leverage later after operating history exists.

8. Customer qualification threshold

The current model suggests a theoretical break-even/target-return threshold near 1.5 MWh/month for a customer with a load shape similar to Worship Harvest. For sales screening, NFE should use a more conservative threshold because fixed costs, site complexity, credit quality, solar yield and load shape vary.

Monthly usage	Screening interpretation
< 1.5 MWh	Usually below current economic threshold for a stand-alone Commercial RPM Phase 2.
1.5-2.0 MWh	Possible but marginal; requires especially favorable site/load/credit conditions.
>= 2.0 MWh	Recommended first-pass Commercial RPM qualification threshold.
>= 3.0 MWh	Strong candidate, subject to solar-compatible demand and site/credit quality.
Worship Harvest: ~6.9 MWh	Comfortably above the consumption threshold; the remaining work is engineering, regulatory, credit and financing validation.

9. Bankability risks and mitigations

Risk	Why it matters	Proposed mitigation
Volume risk	Customer pays for energy used; NFE debt service does not fall if customer consumption contracts.	Lower leverage for early sites; strong customer underwriting; termination protection; consider a modest minimum annual energy commitment only where financing requires it.
Tariff/indexation risk	A fixed customer tariff can become uneconomic as utility prices and operating costs change.	Contractually mirror the applicable utility tariff structure or define a transparent indexation formula.
Credit/collection risk	Energy revenue is the project cash flow.	Credit review, payment history, deposits, remote metering, clear default/curtailment procedures and diversified portfolio.
Technology/lifecycle risk	Battery/inverter replacement can destroy economics if omitted.	Explicit replacement reserve, manufacturer warranties, standardized equipment and remote health monitoring.
Performance risk	PV yield or storage availability may underperform assumptions.	Conservative yield, performance guarantees where available, commissioning tests and reserve margins.
Regulatory risk	The legal structure for on-site generation/resale/EaaS must be valid.	Obtain Uganda-specific regulatory/legal confirmation before financial close and standardize the compliant contract structure.
EPC / construction risk	Cost overruns or poor installation can impair returns and safety.	Competitive RFQ, fixed-price scope where feasible, commissioning acceptance tests and appropriate EPC warranties.

10. Proposed cash-flow waterfall

1. Customer pays NFE for metered electricity under the EaaS contract.
2. NFE/SPV pays utility/grid energy costs and other variable energy costs.
3. NFE/SPV funds routine O&M and operating expenses.
4. NFE/SPV funds the agreed battery/inverter lifecycle reserve.
5. Remaining operating cash is CFADS for lender purposes under the internal screening model.
6. Scheduled senior debt service is paid.

7. Required DSRA top-up, if any, is funded.
8. Residual distributable cash is available to NFE / equity investors.

11. Decisions requested from the NFE team

Decision	Current working position	Team discussion
Commercial Phase 2 product definition	Battery reliability + enough PV to support the economics.	Confirm whether this becomes the standard default or remains site-specific.
Customer tariff promise	Utility-equivalent tariff, not an equipment lease.	Define exactly which utility charges are mirrored and how tariff changes flow through.
Reliability promise	6-hour outage coverage for contracted critical load.	Decide whether the product SLA should be framed as hours, availability %, or both.
Debt strategy	50-55% debt for early projects; target $\leq 12\%$, 10+ years.	Confirm acceptable leverage and target lender categories.
Customer minimum usage	No hard minimum in the preferred customer proposition.	Decide whether a soft minimum annual energy commitment is acceptable when a lender requires it.
Phase 4 ownership	Predefined buyout from a stated year, subject to lender discharge.	Agree lockout year and buyout methodology.
Commercial screening threshold	≥ 2 MWh/month first-pass screen.	Confirm and add load-shape, credit and site criteria.
Portfolio/SPV structure	Preferred long-term financing architecture.	Decide when to establish the first RPM project/portfolio SPV.

12. Immediate next steps

9. Install/obtain interval metering for Worship Harvest and identify critical vs. discretionary loads.
10. Request at least two local EPC/vendor quotations for the 120 kWh / 50 kW / 36-40 kWp design range.
11. Refresh the model with quoted CAPEX, warranty terms, installation scope and realistic replacement assumptions.
12. Confirm the legally compliant Uganda EaaS / on-site resale structure and required permits/licences/exemptions.
13. Complete a customer credit review and obtain a longer utility-payment history if available.
14. Develop the standard Commercial RPM EaaS term sheet: tariff indexation, SLA, deposit, termination, access, insurance and Phase 4 buyout.
15. Prepare a lender-facing model with monthly cash flows, debt amortization, downside cases and covenant tests.
16. Build a pipeline scorecard so NFE can screen commercial leads consistently before spending engineering time.

Appendix A - Model assumptions that must be refreshed before investment approval

Assumption	Current working value	Validation method
Annual load	~82.9 MWh	12 months of bills + interval metering
Solar yield	~1,500 kWh/kWp/year	Site-specific PV simulation / irradiation dataset
Installed CAPEX	~UGX 143m for 120 kWh + 50 kW + 40 kWp	Competitive EPC/vendor RFQs
Project term	15 years	Customer contract negotiation
Debt cost / tenor	12% / 10 years illustrative	Lender term sheets
Lifecycle reserve	Modelled explicitly	Warranty, cycle-life and replacement-price analysis
Utility-equivalent tariff	Working weighted energy price from current tariff structure	Refresh at proposal date and define indexation
Customer load shape	Historical TOU shares from bills	Interval metering
Regulatory structure	Not yet confirmed	Ugandan legal/regulatory review

Appendix B - Interpretation discipline

- All figures are preliminary and intended for internal screening, not a customer quote or investment commitment.
- Do not present IRR, DSCR or the 2 MWh/month threshold without the underlying assumptions; they are outputs of this model, not universal constants.
- Equipment prices, tariffs and financing costs are time-sensitive and must be refreshed before every investment decision.
- The model should eventually move from annual averages to monthly/hourly dispatch so reliability and cash flow are tested together.

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