

NFE call 31 Oct 2026: arbitrage, OpenEMS and MQTT (Hillary, Dansturn)

NFE call: Hillary and Dansturn, 31 Oct 2026: minutes

When: Sat 31 Oct 2026, morning (EAT), about 45 min. Aaron could not join; the planned team call (solar data and the optimiser proposal) still has to be rescheduled. **Attendees:** Hillary Arinda, Dansturn Kimbowa.

Summary

A learning session. Hillary explained arbitrage and how the daily figure is worked out, what OpenEMS is (NFE's SCADA software), why protocols and standards matter, and how MQTT works. Dansturn shared leads on UEDCL's SCADA and protection team. The software discussion moves to next week.

Decisions

1. **Software discussion next week.** Today was arbitrage plus the Nansana hardware set-up; software follows.
2. **Outage reporting includes blackouts.** The daily report shows when the battery could not cover an outage (now on the card as "Lights on").

Discussion

Outages

- Outages are many, and both frequency and duration are high. On 29 Oct there were 8 outages, about 15 hours in total. The battery could not cover all of it, and solar could not help at night.
- Hillary asked for the outage report to show when the houses went fully dark (done: the daily card has a "Lights on" figure and black shading).

UEDCL SCADA leads (Dansturn)

- Contacts in UEDCL's SCADA and protection area. Allen is reportedly back and expected to lead SCADA protection. Joslin wrote an article on why power goes off and what is being done: upgrading four or five substations, adding alternative routes, and improving fault response.
- NFE's angle: a SCADA system for them. This needs time and steady relationship-building ("show capability").

Arbitrage (Hillary)

- Time-of-use buy prices: 00:00–06:00 about UGX 430, 06:00–18:00 about UGX 562, 18:00–24:00 about UGX 667. Customers pay a flat domestic rate.
- Buying UEDCL power at peak to resell leaves almost no margin (a small loss once VAT is included). Instead the battery charges at night (about 430) and supplies the evening (about 667). The gain per unit is the price difference, minus losses and battery wear.
- The daily figure (UGX 552 on 30 Oct) is the per-unit margin times the units sold from the battery (7.8 kWh). It is not 7.8 times the selling price.
- What matters is a full battery by about 17:00 (98% on 30 Oct). The 18:00–24:00 window is about one battery's worth, so a bigger battery would add capital and lengthen payback without adding much.
- Business rule: size for the customer's real need. A customer using under about 2,000 kWh a month is not a good business case for solar (like a minimum order quantity).

OpenEMS, protocols and MQTT (Hillary)

- **OpenEMS** (Open Energy Management System) is software. It is NFE's SCADA: it monitors and controls equipment through drivers. NFE added drivers for the CHINT meters and the SRNE inverter (Modbus), which produce the reports.
- **Why not Calin:** LoRa radio with a custom application layer, which locks you in to one vendor. Open standards (Modbus, DLMS/COSEM for meters, IEC 61850 for substations, DNP3) separate hardware from software, so any compliant device can be used.
- **MQTT** (post-office analogy): a publisher (the equipment) sends a payload (readings) to a topic (the address, e.g. `inverter001/voltage`) on a broker (NFE uses Mosquitto). Subscribers to that topic receive it. The broker authenticates both sides, and rules set how long messages stay and whether delivery is confirmed.

- **Learn the OSI model first.** Every protocol maps onto its seven layers, so new protocols become easy to place.

Actions

#	Action	Owner	When
1	Study the OSI model and MQTT; call Hillary to explain them back	Dansturn	this evening (about 18:00 EAT)
2	Share Joslin's article on UEDCL outages and substation upgrades	Dansturn	this week
3	Find out more about UEDCL's SCADA/protection team (Allen's return)	Dansturn	ongoing
4	Reschedule the team call with Aaron (solar data, optimiser proposal)	Hillary	next week
5	Software session	Hillary + Dansturn	next week

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