

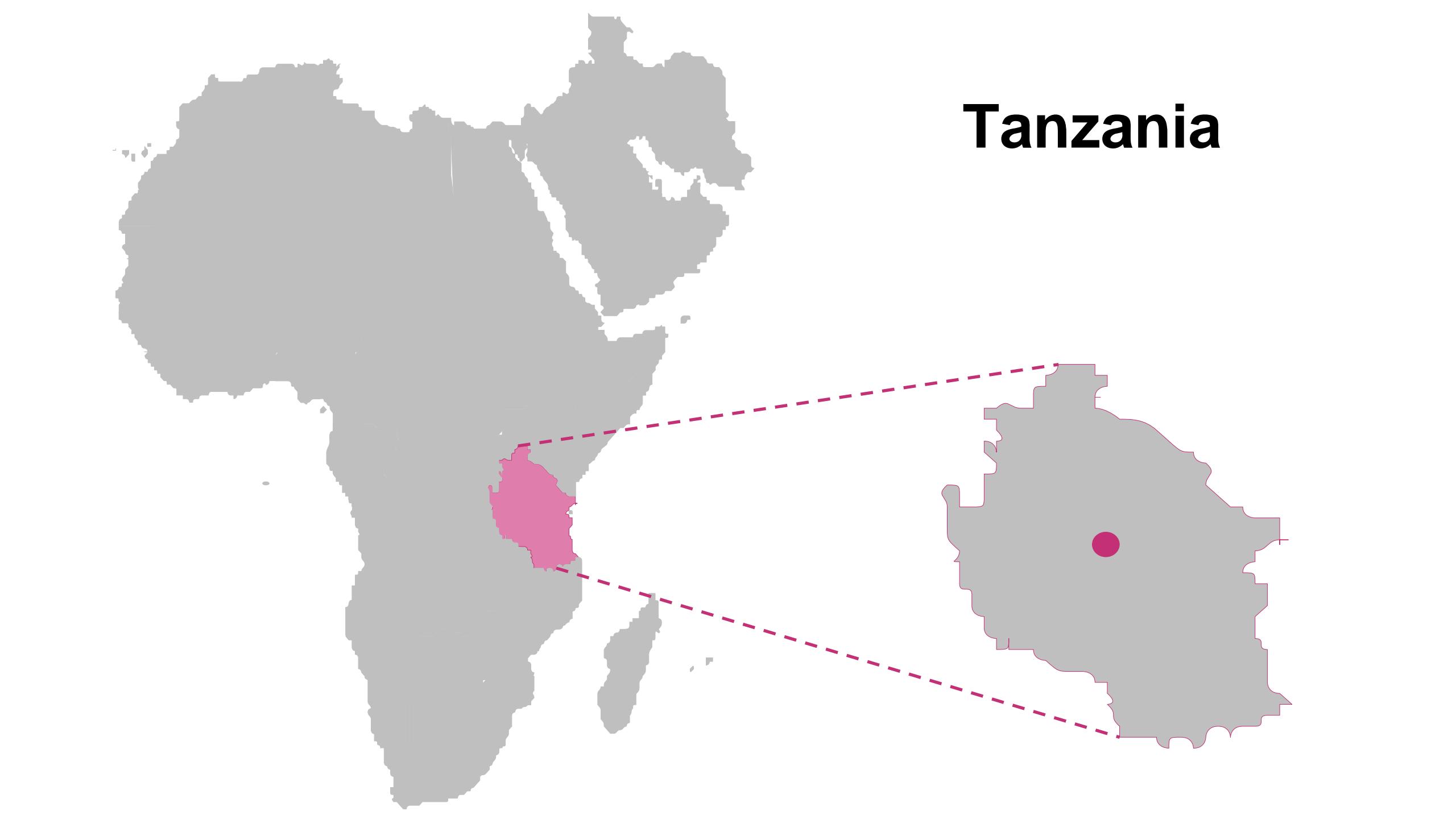


Hendrik Broering
AMMP Technologies

GrafanaCon LA, Feb 2019

How IoT is enabling electrification across rural Africa with smart, renewable energy





Tanzania



Changombe

Country: Tanzania

Region: Manyara

Population: ~2000

**No access to
electricity till 2017**



**Commissioned:
Q1/2017**

**Project Developer:
Rafiki Power**



**Connections:
351**

**Types:
Households &
Businesses**



Laundry service



Fridge / Freezer



Hair dresser



Productive use

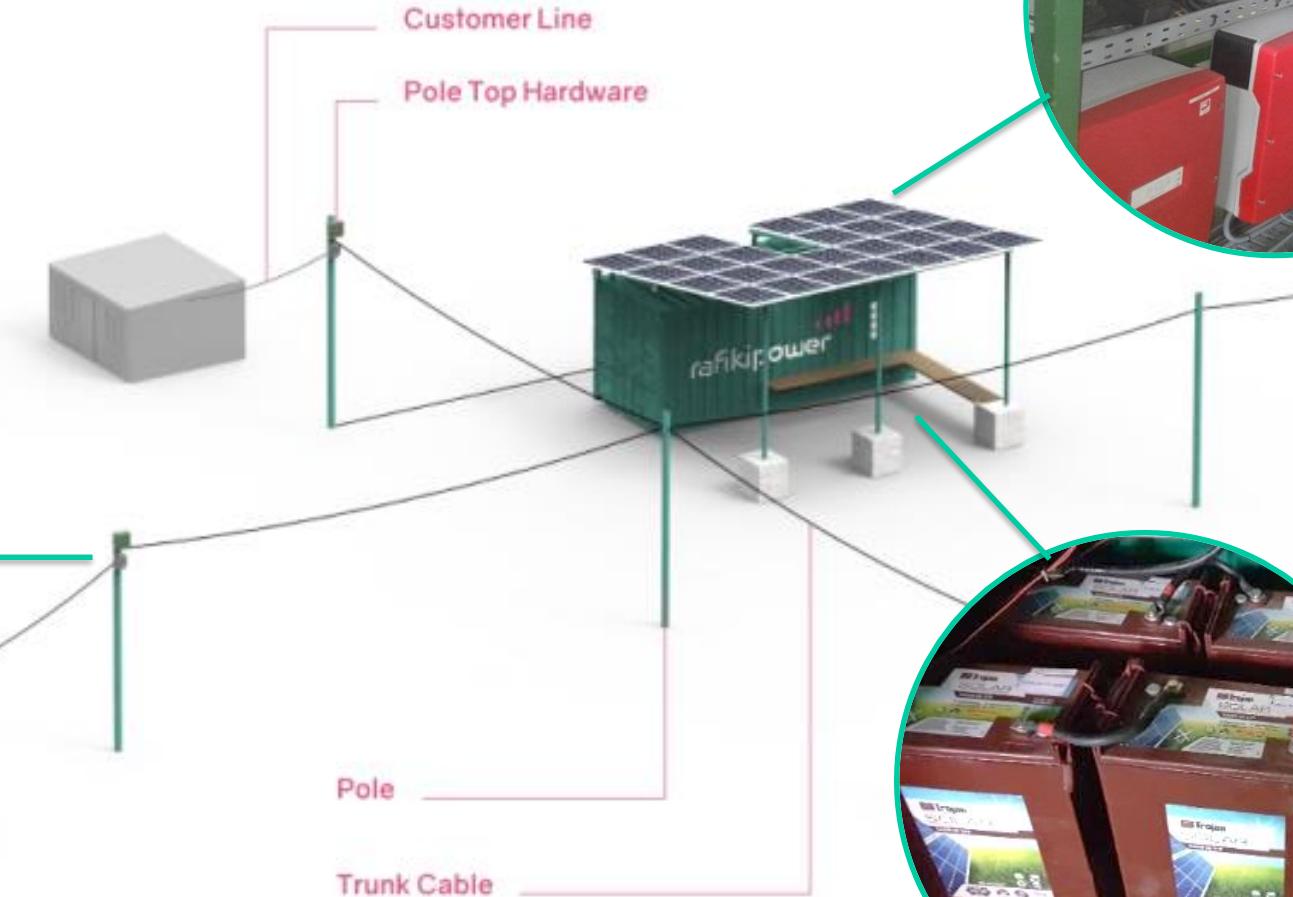
Solar Mini-Grid



Power Electronics



Smart Meters



Batteries





**AMMP monitors
100+ mini-grids
across Africa**



On-site gateway or API - connection



 **influxdb**

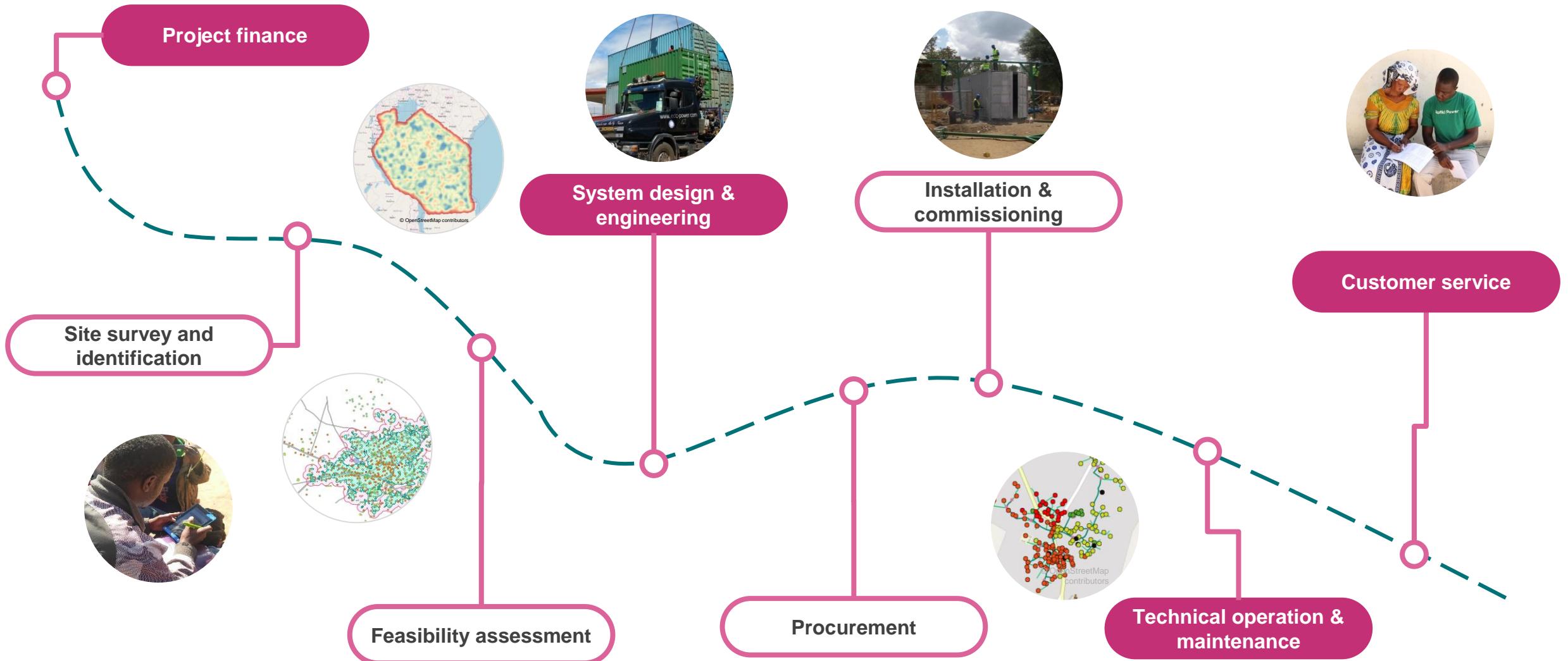


 **Grafana**



 **kapacitor™** + 

Operational data is useful in making smart and fast decisions across the mini-grid value chain



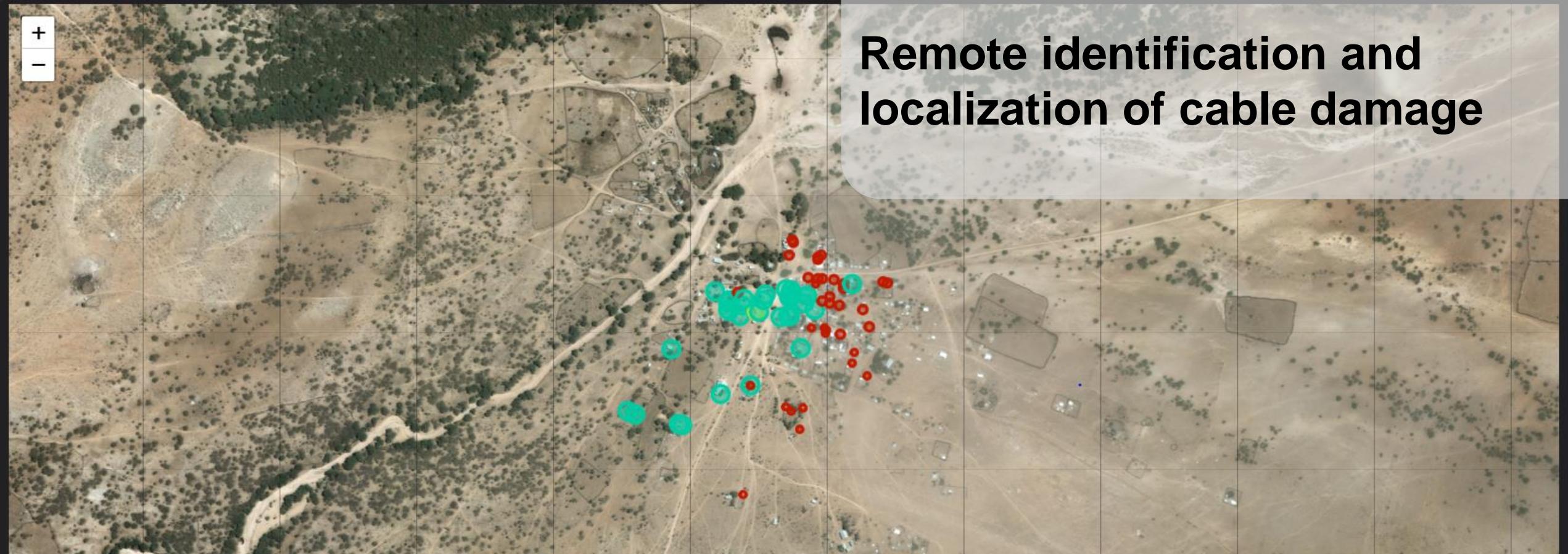
Case 1

**Physical access to
mini-grids is difficult.
Whatever can be done remotely
is beneficial.**



Minimum meter voltage

Remote identification and localization of cable damage



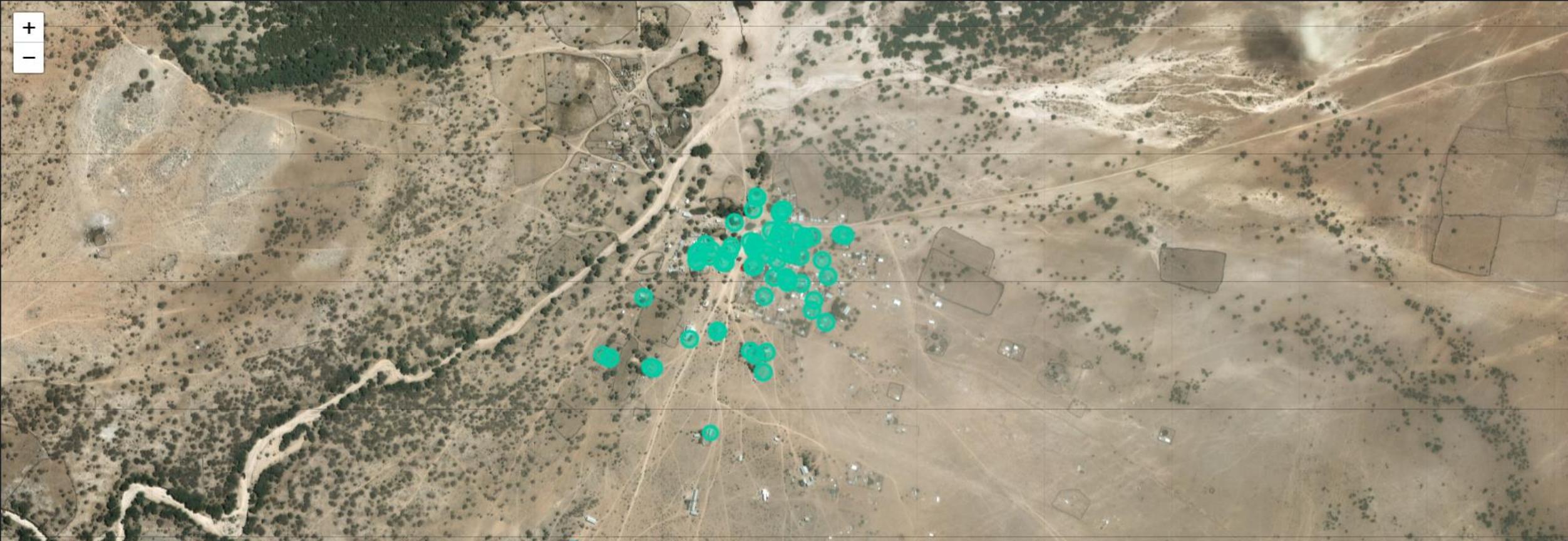
▼ Average Voltage

Meter phase voltage / CSV





Minimum meter voltage



Meter phase voltage / CSV

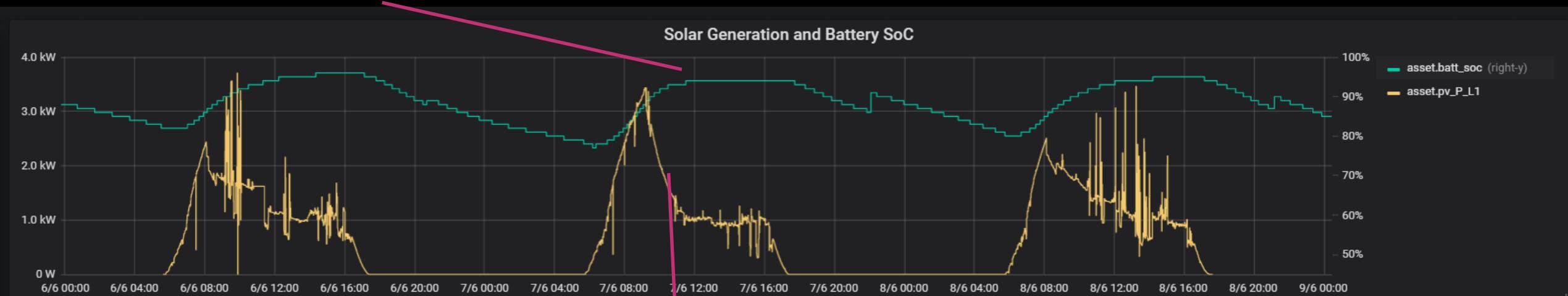


Case 2



Back to Changombe...

**Battery reaches
maximum state of
charge**



PV power curtailment → Unused PV potential

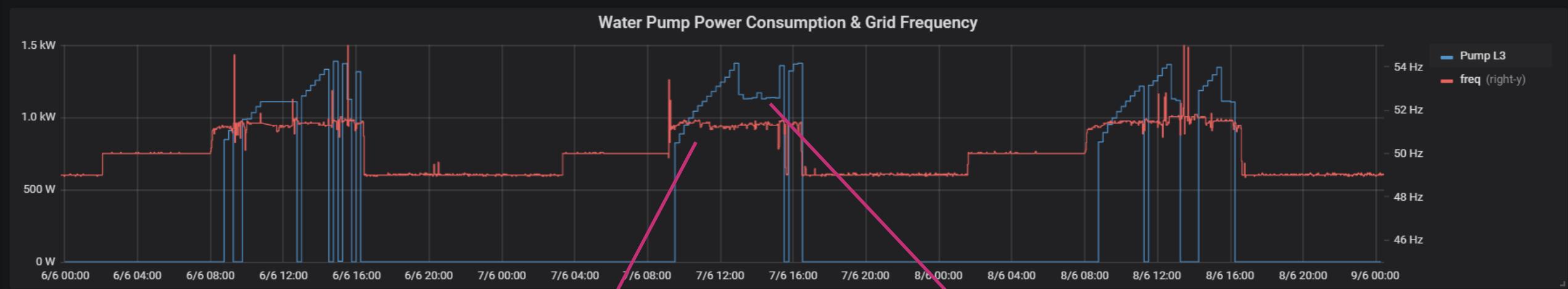
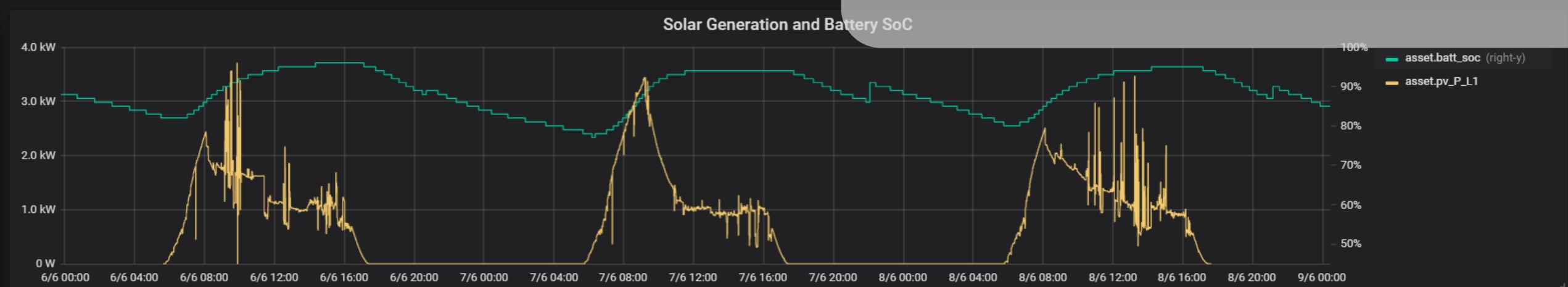


**Commissioned:
Q1/2018**

Power: 1.4 kW

**Yield: 500 l/h
Capacity: 10 000 l**

Smart pump operation allows harvest of extra PV energy



Frequency control

Water tank is being filled



Thank you