

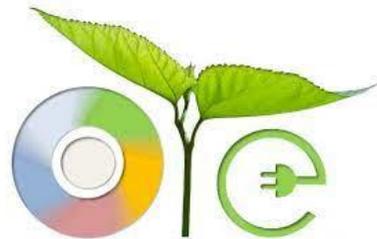
Lateral Electrification

Towards a new power infrastructure development path for Africa

Nanoé & G2Elab

Midi de la Transition Énergétique

26 mai 2023



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A French-Malagasy collaboration



North of Madagascar



Nanoé employée



Lucas Richard



Grenoble, France



PhD student

A challenging ambition

Short-term Challenge :

ENERGY ACCESS



Long-term Challenge :
SUSTAINABLE DEVELOPMENT



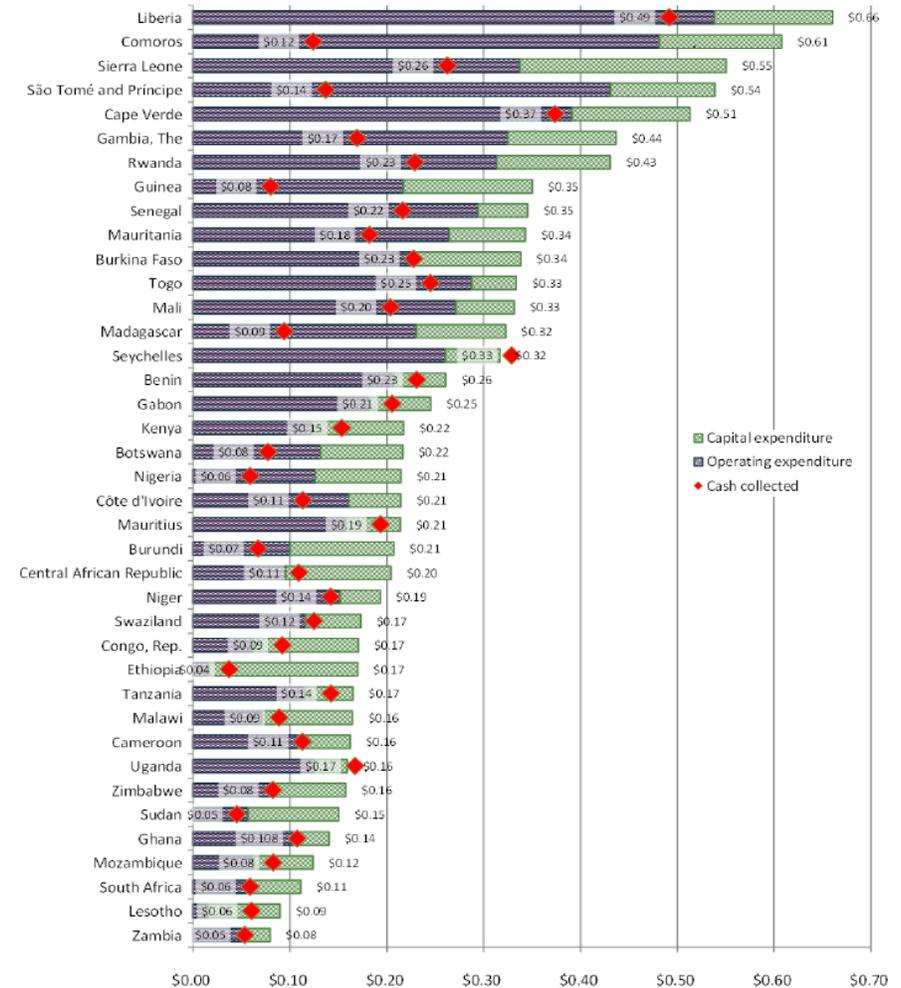
Grid solutions

Short-term challenge **X**

Long-term challenge **✓**

Source: World Bank

- Only 30 % of unelectrified communities at reach of national grid extension
- 110 million people living under the grid
- Highly subsidized tariffs still unaffordable for many
- High LCOE for centralized minigrids
- High initial investment costs
- Lack of modularity and scalability

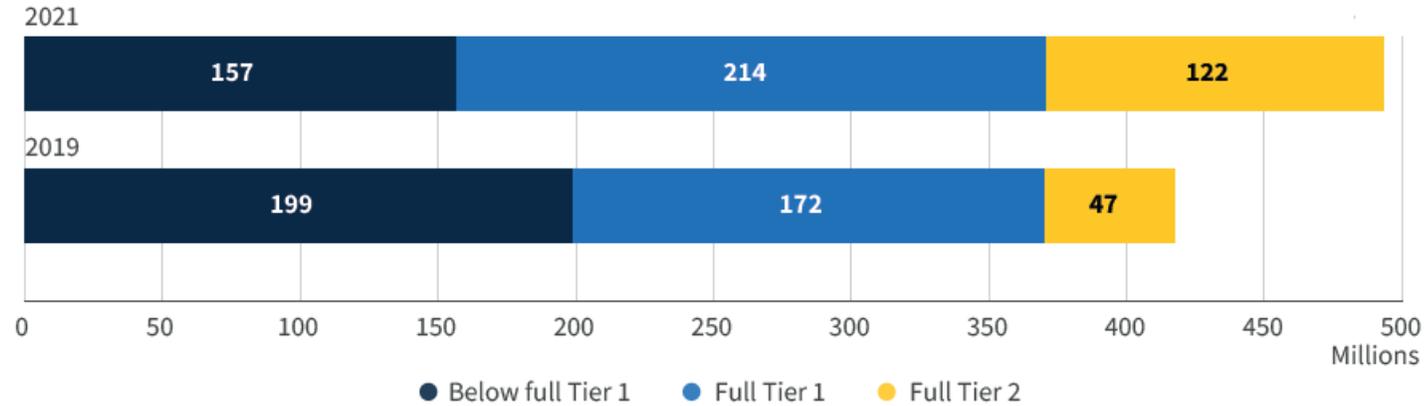


WHY ?

Solar Home Systems

Short-term challenge ✓

Long-term challenge ✗



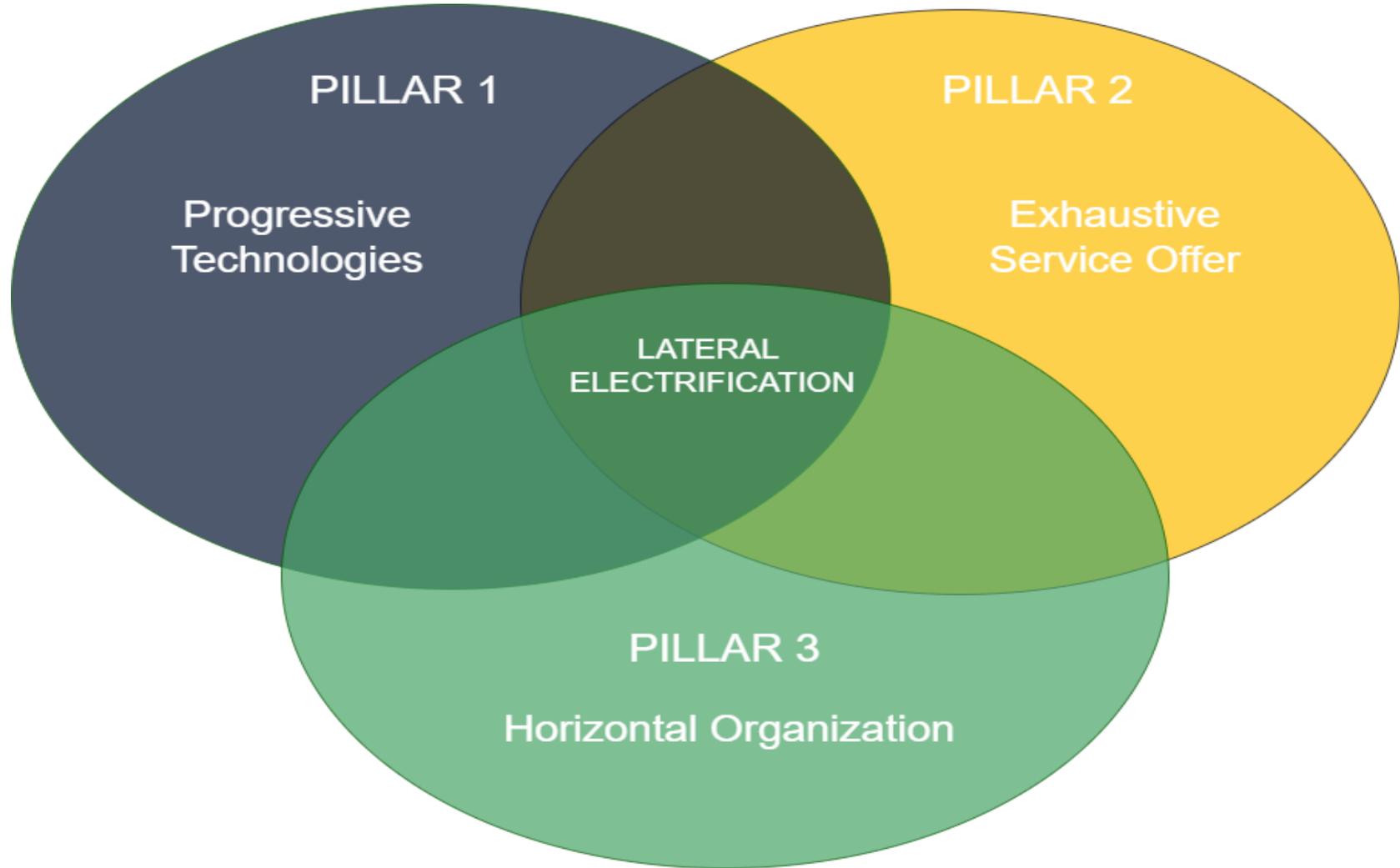
Source: World Bank

WHY ?

- Only a stop-gap measure lacking sustainability and failing with development challenges
- Short expected lifetime, unable to answer productive use needs, often low-quality
- Ownership transfers risk (breakdown, thefts, recycling) to the end-user
- No modularity and scalability

Our Solution

➔ A third way to reconcile both challenges: the Lateral Electrification model



1. Progressive technologies

IMMEDIATELY

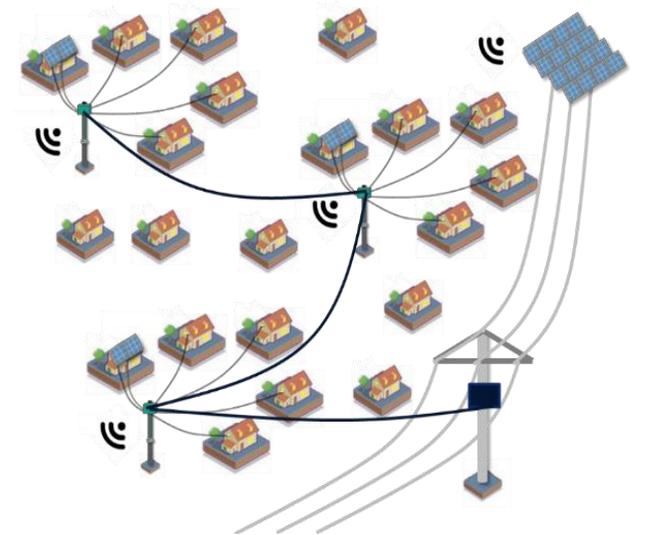
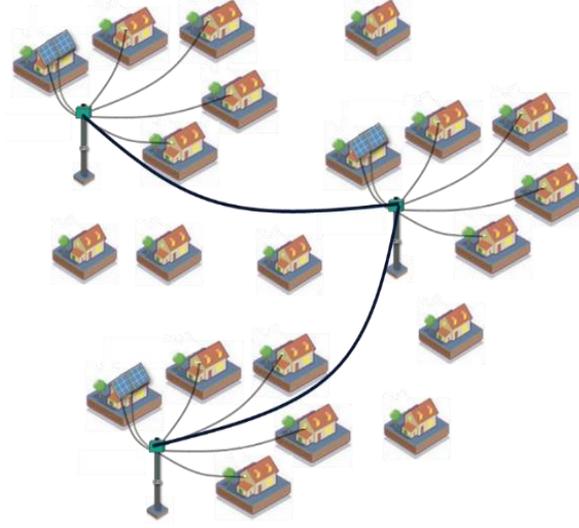
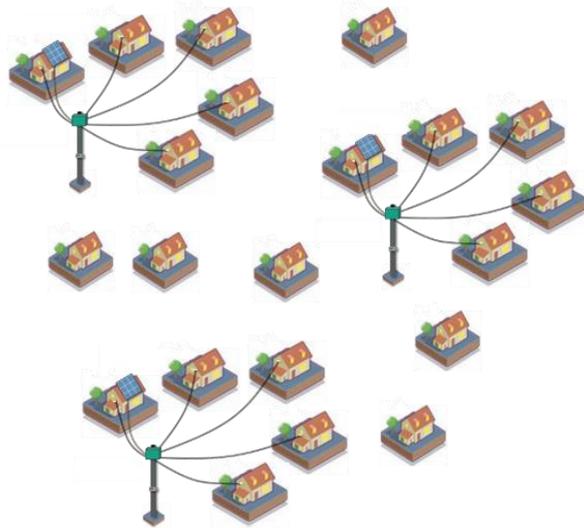
AFTER 2 TO 5 YEARS

AFTER 5 TO 10 YEARS

NANOGRIDS

MICROGRIDS

MINIGRIDS



143 €/User



+ 112 €/User

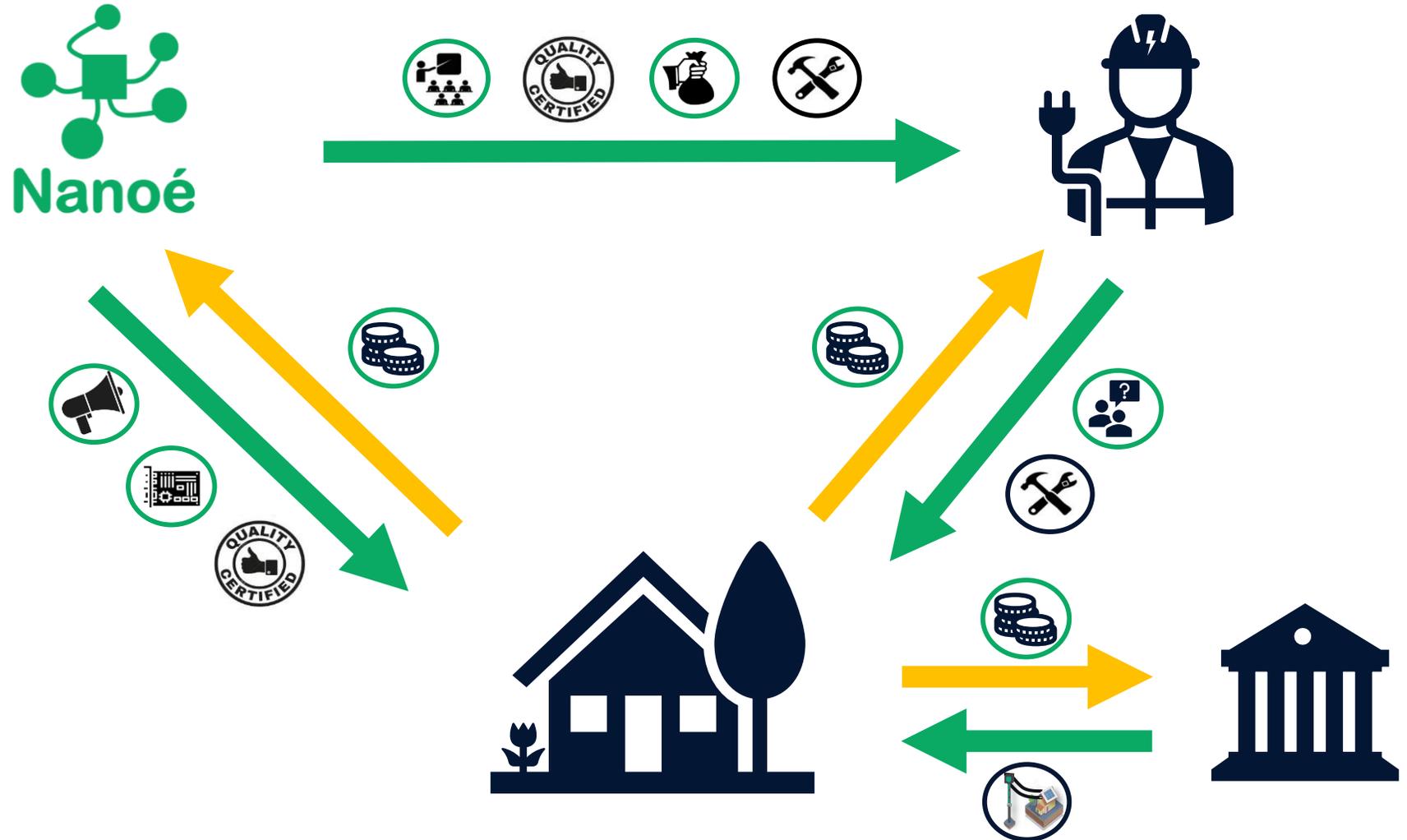


+ 100-500 €/User

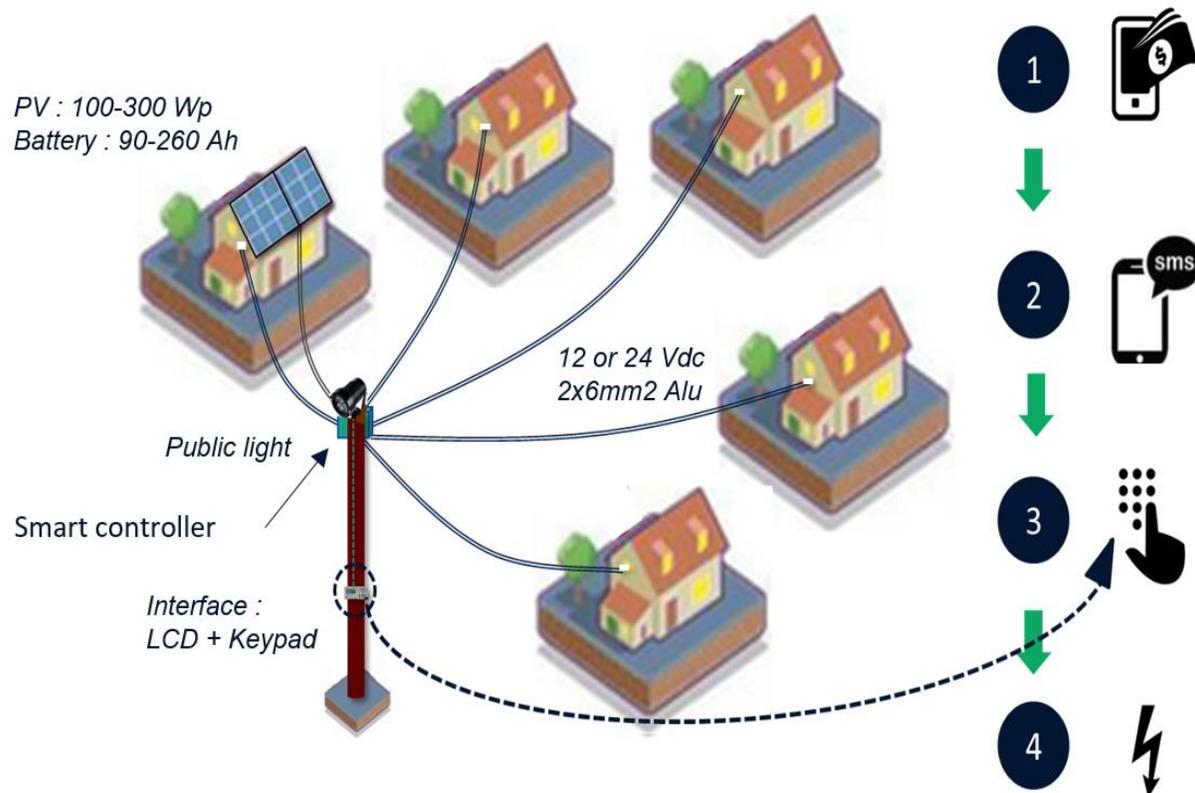
2. Exhaustive service offer

FEE FOR DEVICE		FEE FOR SERVICE	
Device	Initial fee (in \$)	Service	Daily fee (in \$/day)
 3W	10 \$	10 Wp 50 Wh/day	0,15 \$/d
 4W	~ 10 \$	18 Wp 90 Wh/day	0,23 \$/d
USB  5W	~ 10 \$	30 Wp 150 Wh/day	0,30 \$/d
 8W	~ 15 \$	42 Wp 210 Wh/day	0,45 \$/d
PL  12W	~ 30 \$	66 Wp 330 Wh/day	0,60 \$/d
 15W	~ 100 \$	100 Wp 500 Wh/day	0,91 \$/d
 60W	~ 850 \$	125 Wp 1250 Wh/day	1,50 \$/d

3. Horizontal organization



First step: the nanogrids



Smart controller

Keypad

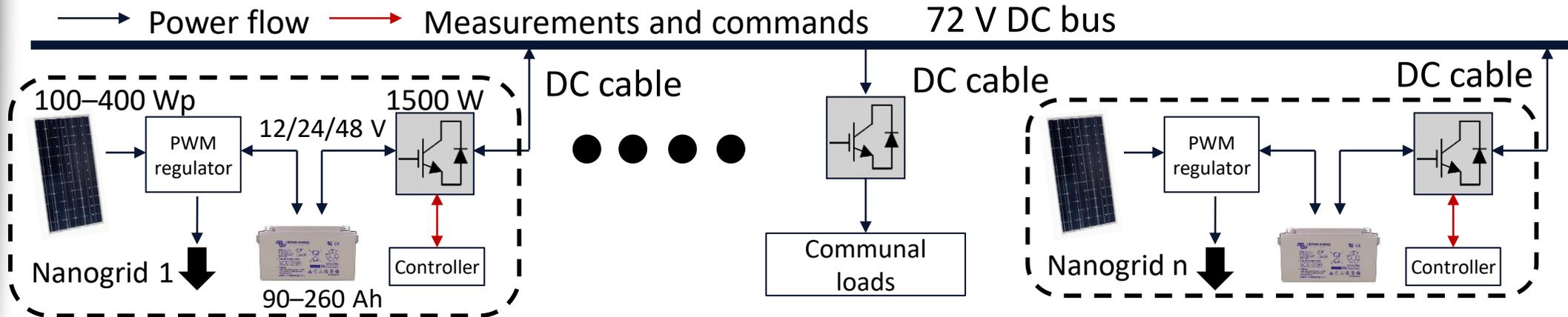


NanoBe App

An autonomous collective DC solar system up to Tier 2 access.

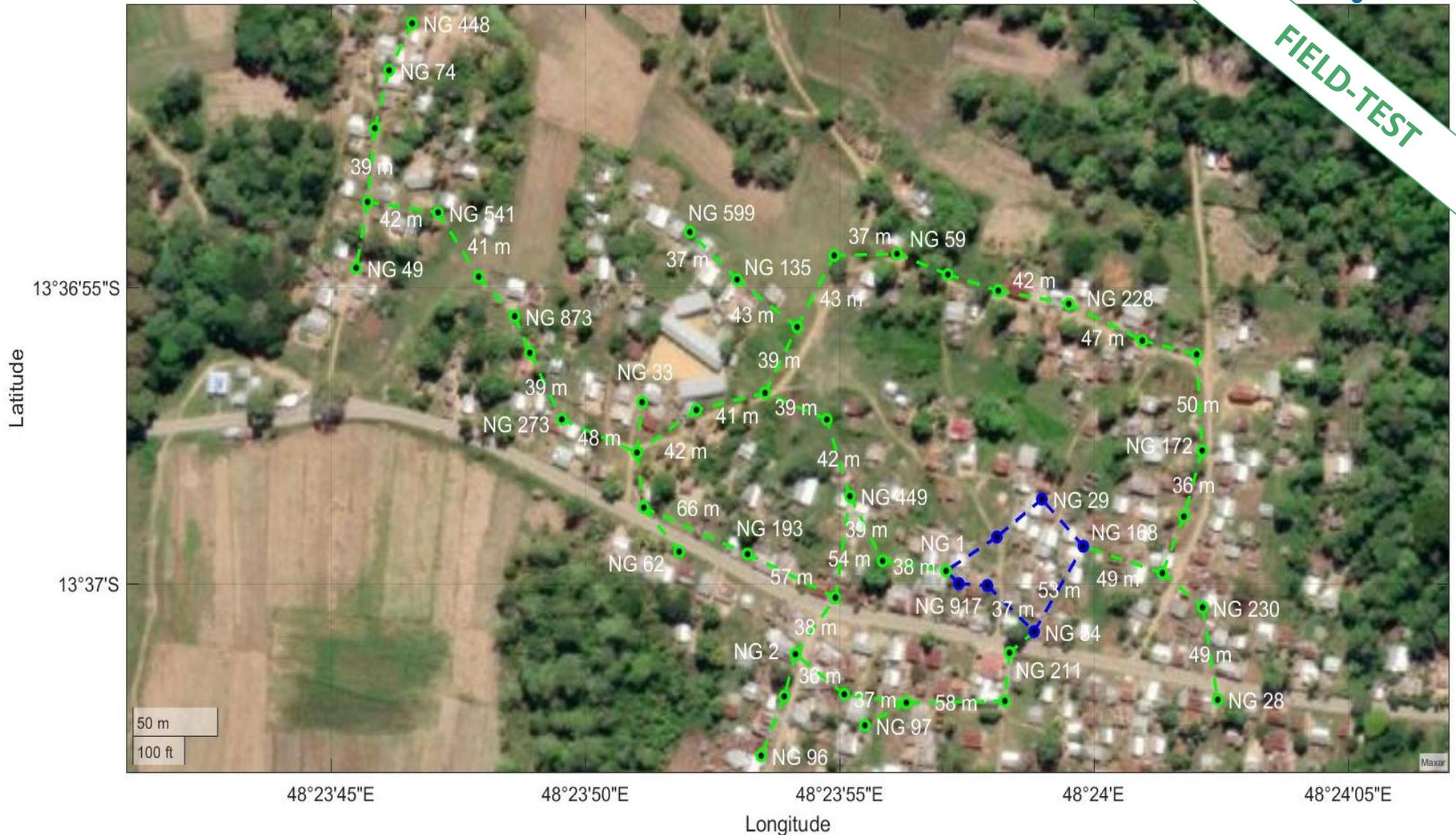
Second step: the microgrids

- ❑ For oversized (« strong ») nanogrids to support undersized (« weak ») nanogrids
- ❑ To improve the electrical services delivered to the end-users (communal loads, AC inverters, better reliability, etc.).
- ❑ To install nanogrids without batteries, i.e. point of consumption only.
- ❑ To use less solar panels and batteries while achieving the same electrical services.



A successful field-test !

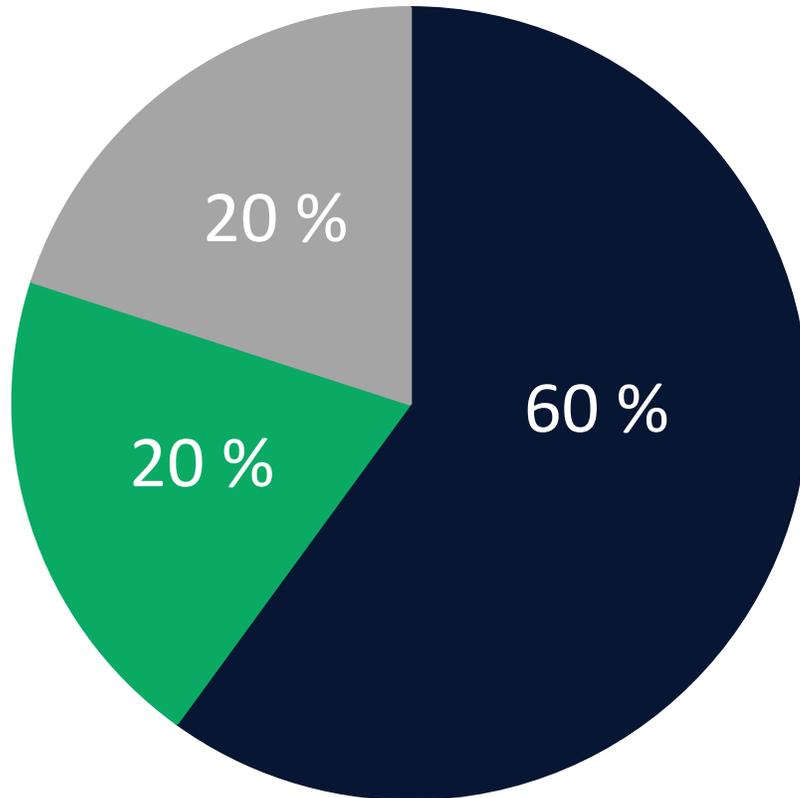
FIELD-TEST



● Electric Poles - - Microgrid Installed in 2021 - - Microgrid Extension in 2022

Revenues from electricity services

Revenue sharing scheme



● Nanoé ● Local entrepreneur ● Nanogrid owner

IMPACT

Investment possibilities and new job opportunities.

SCALING

Local capacity building and knowledge transfer.

SUSTAINABILITY

Economical interests well aligned.

What we already achieved



1550

Nanogrids (including 35 health facilities)

> 6500

End-users

> 70 %

Connection rate in some villages

50

Employees in 4 different offices

> 100

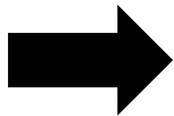
entrepreneurs trained



Productive use of energy

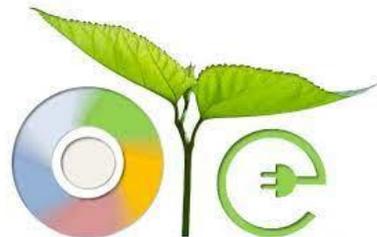
FIELD-TEST

- ✓ Freezers already installed on field.
- ✓ Agro-processing machine tested on the microgrid.
- ✓ AC loads connected on the microgrid through inverters.



Development of new services (hair kiosks, multimedia salon, agro-processing and craftsmanship machines) in progress !





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