

Zenzeleni Networks:

A case study of a community network in rural South Africa

Dr. Carlos Rey-Moreno
carlos@apc.org

CRASA Workshop: “Reaching the unserved”

16th May 2018, Mauritius

Mankosi, Eastern Cape, South Africa



12 villages, 580 households (around 3500 people) in around 30km² (between Coffee Bay and Port St. Johns)

Low access to services (no tar roads, only 2.1% households connected to the grid)

Low income (average R388/month per person)

Low level of education 13% of people with completed matric.



Local committee meeting monthly since 2013

Perseverance based on local value

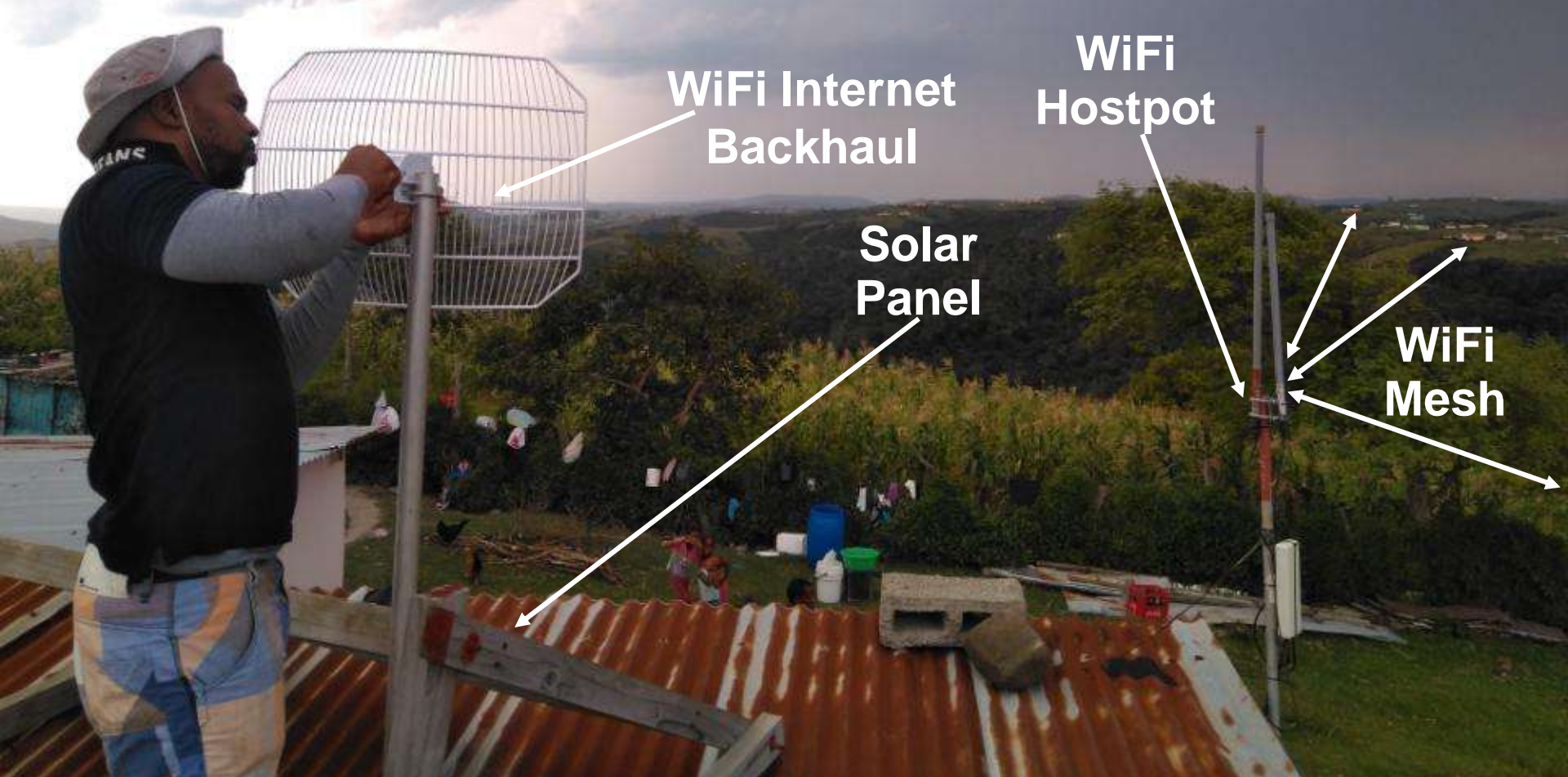


“I didn’t know that you could get a little bit of money without having to go outside of the community to work hard. That is the future I want for my children.”

Davide Lukhozi,
Zenzeleni Networks Mankosi board
member

Spent most of his youth working in
the mines





- Solar Powered
- WiFi Internet Backhaul, Mesh & Hotspot

Certificate of Registration

CR10

Registration Number: 2014/002051/24
Enterprise Name: ZENZELANI TELECOMMUNICATIONS NETWORK PRIMARY CO-OPERATIVE LIMITED



REPUBLIC OF SOUTH AFRICA
CO-OPERATIVES ACT, 2005

CERTIFICATE OF REGISTRATION
OF A CO-OPERATIVE
(SECTION 7)

I hereby certify that

ZENZELANI TELECOMMUNICATIONS NETWORK PRIMARY CO-OPERATIVE LIMITED

was registered on

5/2/2014

under Section 7 of the Co-Operatives Act, 2005 (Act 14 of 2005),
with registration number

2014 / 002051 / 24

as a Primary Co-Operative with a limited liability.
Its constitution was also registered on the same date.

I further certify that

ZENZELANI TELECOMMUNICATIONS NETWORK PRIMARY CO-OPERATIVE LIMITED

is with effect from **5/2/2014** entitled to commence business.

REGISTRAR OF CO-OPERATIVES

Page 2 of 3

Physical Address:
the dff Campus - Block F
77 Maritzburg Street
Sunshine 2001

Postal Address: Co-operatives
Private Bag 4237
Pretoria
0001

Dotcom: 256
Web: www.cipc.co.za
Contact Centre: 080 100 2472 (CIPC)
Contact Centre (International): +27 12 394 3500



Independent Communications Authority of South Africa

Pinmill Farm, 164 Katherine Street, Sandton
Private Bag X10002, Sandton, 2146

Licensing and Compliance

Tel: +27 11 566 3645

Fax: +27 11 566 3646

Email: ahlabloa@icasa.org.za

Ref: PECN/0018/2014/ECSLE/0003/2014

Masibulele Siya

Zenzeleni Telecommunications Network
Primary Co-Operative Limited
Mankosi Administrative area
Ward 26, Nyandeni Municipality
Eastern Cape

Per email: jaysiya26@gmail.com

Dear Masibulele Siya

**RE: APPLICATION FOR PECN AND ECS LICENCE EXEMPTIONS:
ZENZELANI NETWORK**

1. We refer to your application received on 14 April 2014 for Private Electronic Communications Network Service (PECN) and Electronic Communications Service licence exemption.
2. We advise that the Authority has granted Zenzeleni Telecommunications Network Primary Co-Operative Limited a licence exemption to construct, maintain and operate a PECN to be used principally for or integrally related to the internal operations of Zenzeleni Network.

International Funding



EQUAL RATING INNOVATION CHALLENGE

powered by mozilla



Upgrading the Zenzeleni Network

Lwando Mdleleni, South Africa Gauteng Chapter

Start date: March 2016

Mankosi, in the Eastern Cape Province, is one of South Africa's most economically disadvantaged communities. Most residents live on less than \$2 US per day. In spite of this, the people living there value connectivity like anyone else. Residents spend an average 22% of their income on the ability to connect and communicate. Unfortunately, even with this, less than a quarter of residents are online in any given month. Those that are keep their usage to a minimum.

Upgrading Zenzeleni Networks

Thankfully, Mankosi is getting an alternative to expensive, spotty service. The Zenzeleni Network co-op was set up in 2012 to provide voice service to the community, using analog phones connect to WiFi routers and VOIP technology.

Now, South Africa Gauteng Chapter and the University of Western Cape are assisting Zenzeleni Networks to upgrade the system to create a powerful and stable network to help get more people online. The program will also see computer labs set up in the Mankosi's primary and secondary school, and computer literacy training for teachers. The goal is to make it possible for people in Mankosi to get online for a fraction of what it currently costs, and turn Zenzeleni into a model for community-owned telecommunications companies.

Project goals:

- Deployed an operational dual band WiFi mesh network extending the number of points of presence of the current one in the first three months of the project.
- Connected the network to a cheaper and more reliable backhaul in the first three months.
- Set up the computer rooms in the school and the high school and provided basic computer literacy to their teachers by the fourth month.
- Provided training about the potential of community networks and the Internet, including electronic resources available online in isiXhosa, innovation, ICT and entrepreneurship by the sixth month.
- Made available to community members of the VoIP WiFi enabled devices to provide the Internet at a



Finalist

Zenzeleni "Do it for yourselves" Networks (ZN)

Team leader: Dr Carlos Rey-Moreno

Location: Cape Town, South Africa

Bottom-up telecommunications co-operatives that allows the most disadvantaged rural areas of South Africa to self-provide affordable communications at a fraction of the cost offered by other operators.

Zenzeleni Networks: Towards effective use and social appropriation of the internet in rural South Africa

Zenzeleni Networks is a locally owned and operated cooperative which has brought access to the internet and voice communication, within a reduced cost framework, to an impoverished community in Mankosi (Eastern Cape of South Africa). Zenzeleni Networks has successfully intervened in a rural South African community, given that to date the government and private operators have not been able to bring rural South Africa into the digital era. The Zenzeleni model includes a solar-powered wireless mesh network that provides voice calls through 10 publicly accessible analogue phones spread throughout the community. Zenzeleni Networks is currently planning to expand this model to neighbouring communities.

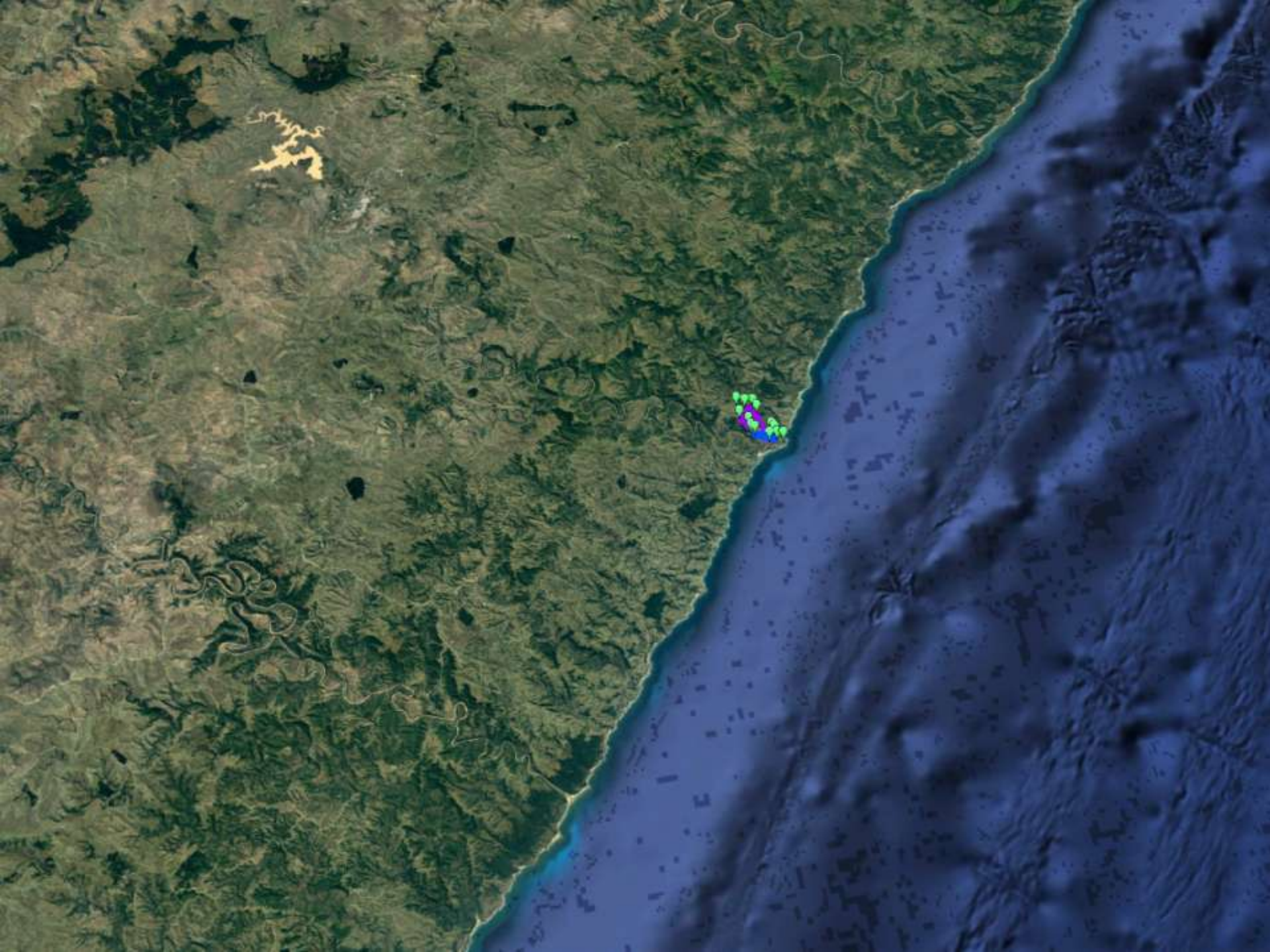
However, a key concern related to the provisioning of affordable voice and internet connectivity is the notion of development. The provision of access to telecommunications infrastructure is but one side of the coin. The ability to harness the infrastructure to facilitate and enable social and economic outcomes for the community is the other. This project thus aims to design and implement a programme to catalyse uptake of the network service, so that tangible social and economic outcomes among the community members are realised in the medium to long term.

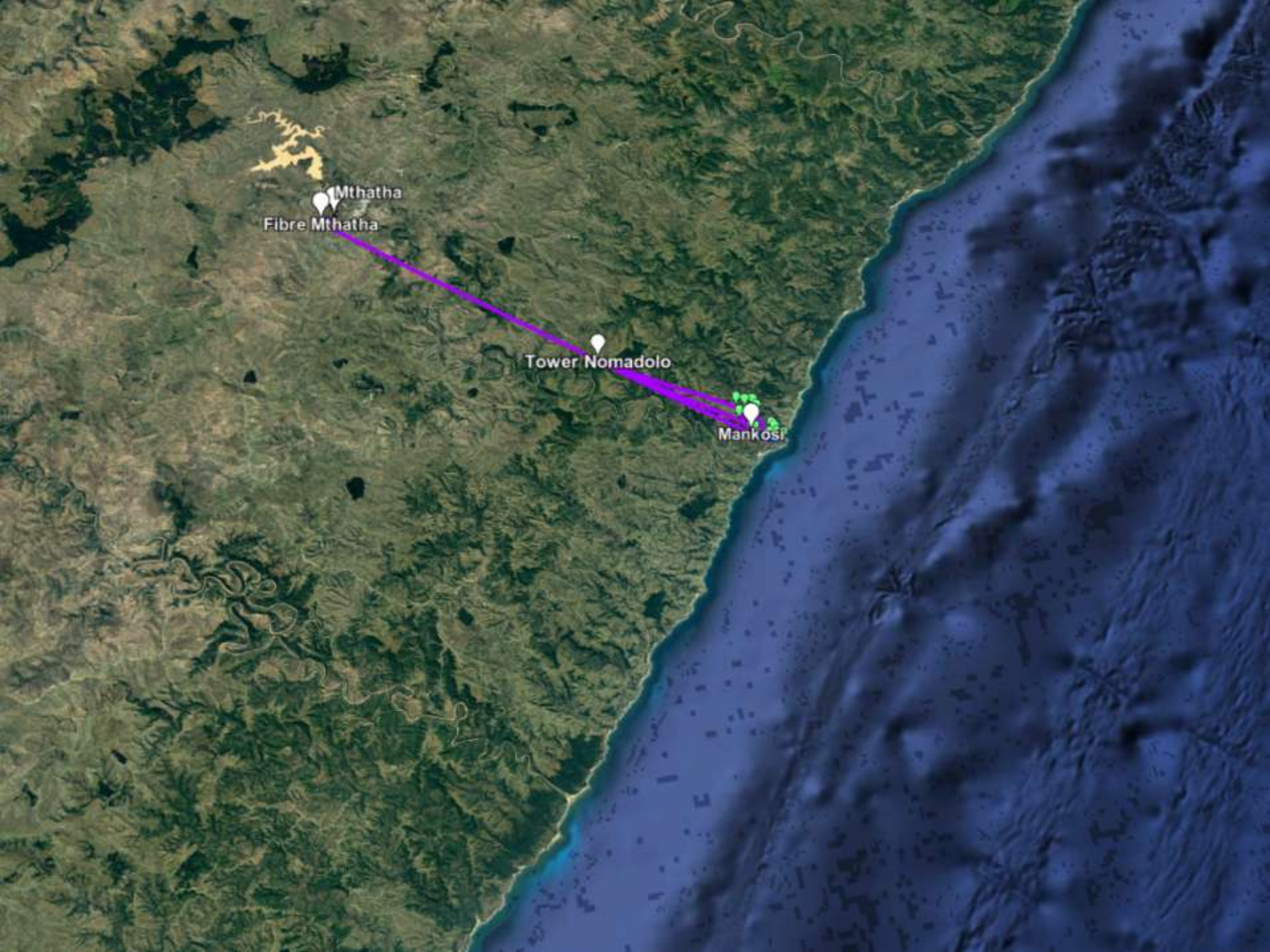
This project seeks to advance the Mankosi project by exploring the barriers to adoption and use of the internet by the community to inform further programmatic interventions both in Mankosi and, subsequently, in surrounding communities, as the Zenzeleni infrastructure gets expanded, supporting digital literacy development and capacity building among youth and other sectors of the community; and facilitating the broader goal of social inclusion, agency and aspirations of the Mankosi community through targeted digital programme interventions. Most importantly, this project serves to inform and refine the demand side of the Zenzeleni model, so that the upscaling to the greater King Sabata Dalindyebo and Nyandeni municipalities envisaged over the next two years will have a greater chance of success.



Zenzeleni Networks NPC incorporated in July 2017

Ensure community ownership and skill transfer

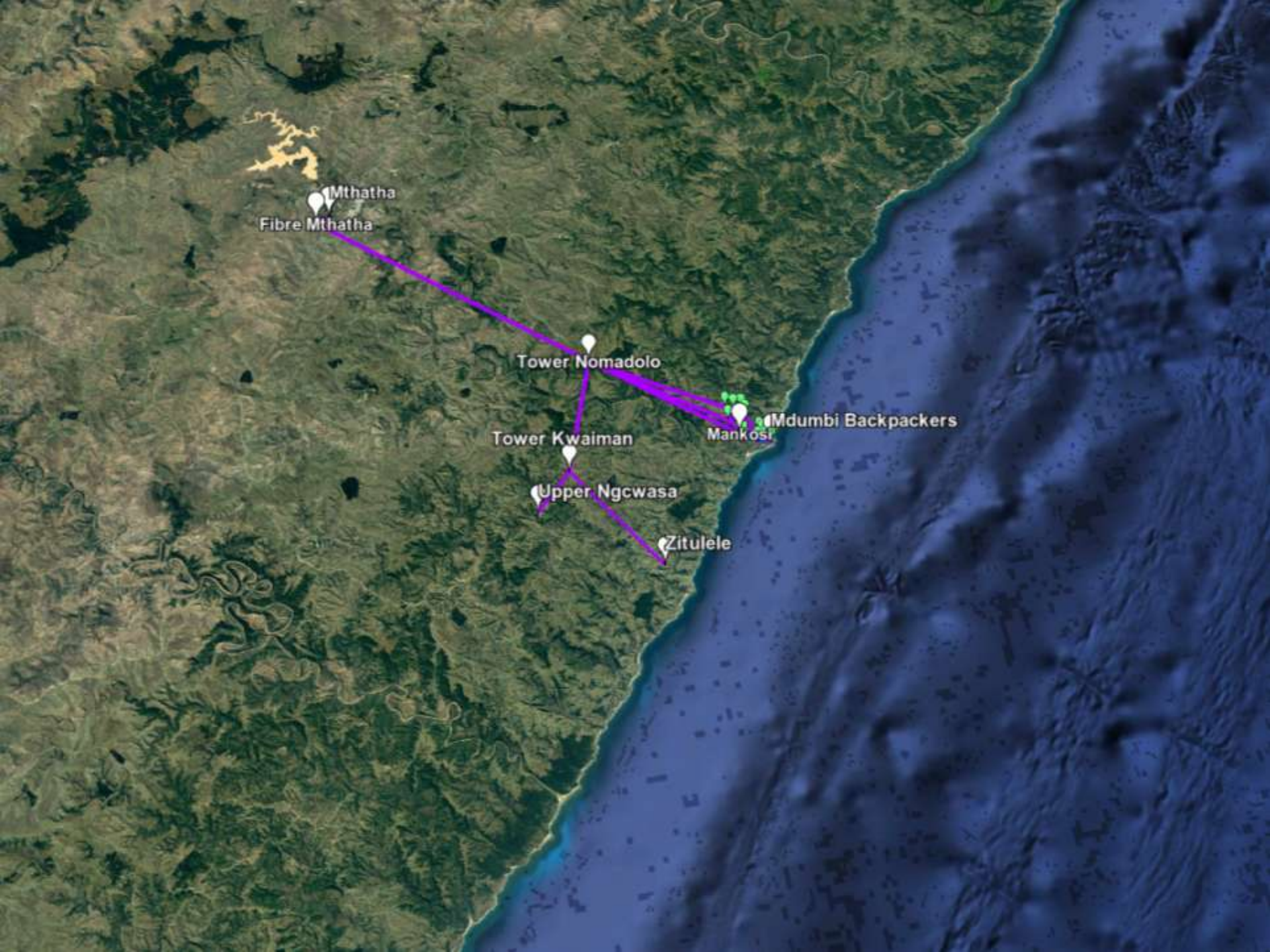




Mthatha
Fibre Mthatha

Tower Nomadolo

Mankosi



Mthatha
Fibre Mthatha

Tower Nomadolo

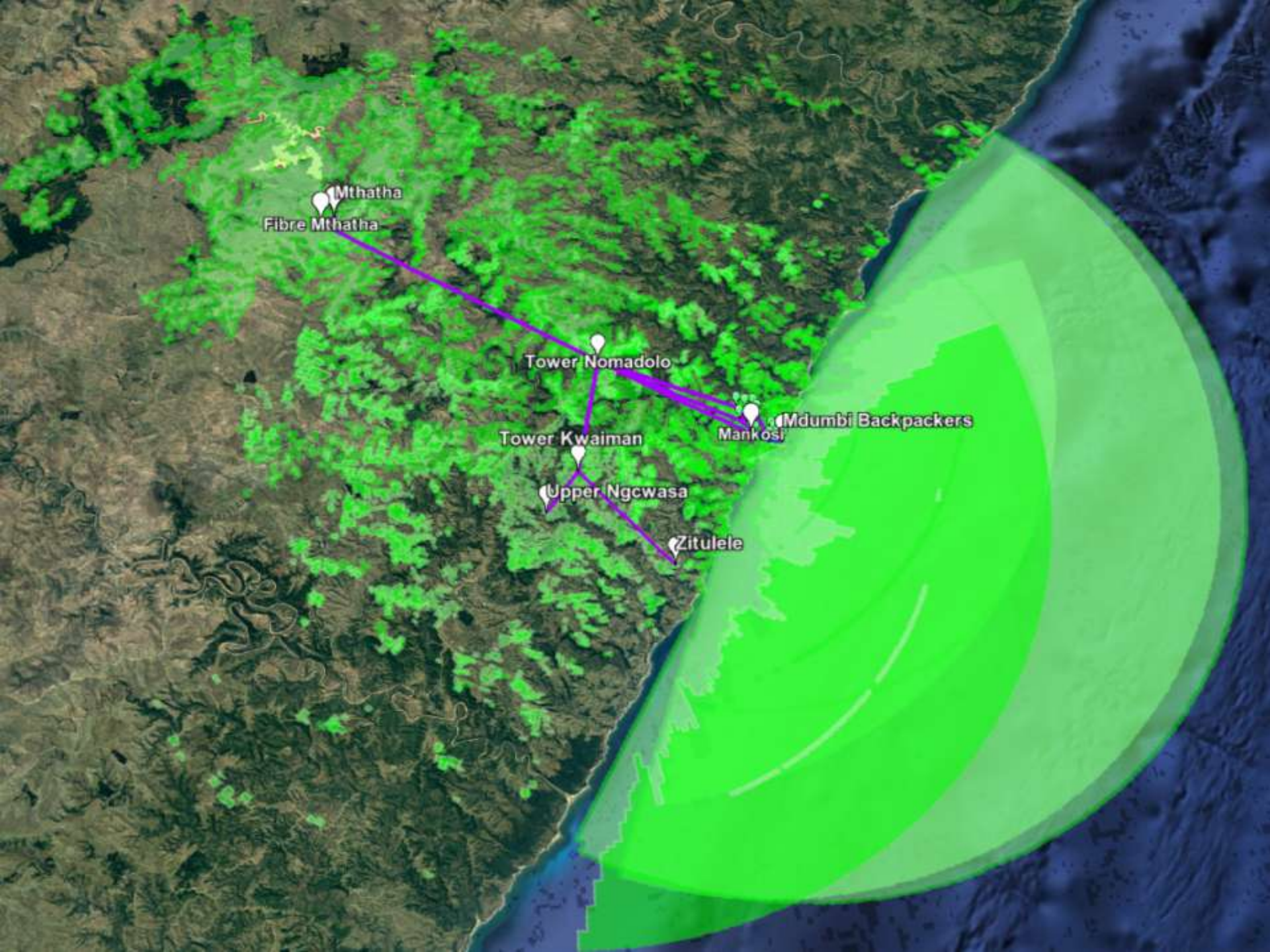
Tower Kwaiman

Upper Ngcwasa

Zitulele

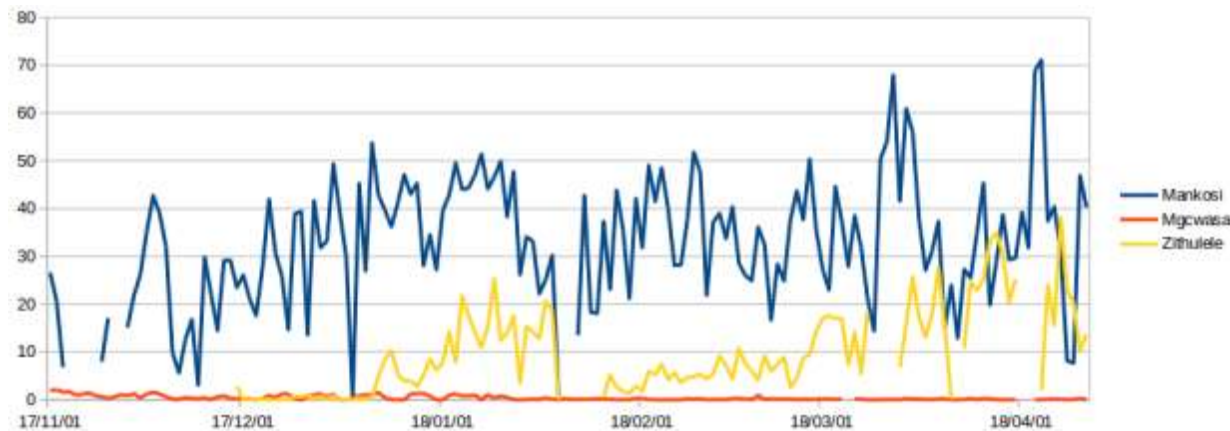
Mankosi

Mdumbi Backpackers



Some hard facts

- November to now :
 - 10 businesses: NGOs, backpackers, schools, clinic
 - 5K unique devices
 - 7000 GB of traffic



Cost up to 20 to 100 times cheaper than other options (in Mankosi 10R/month for unlimited internet)

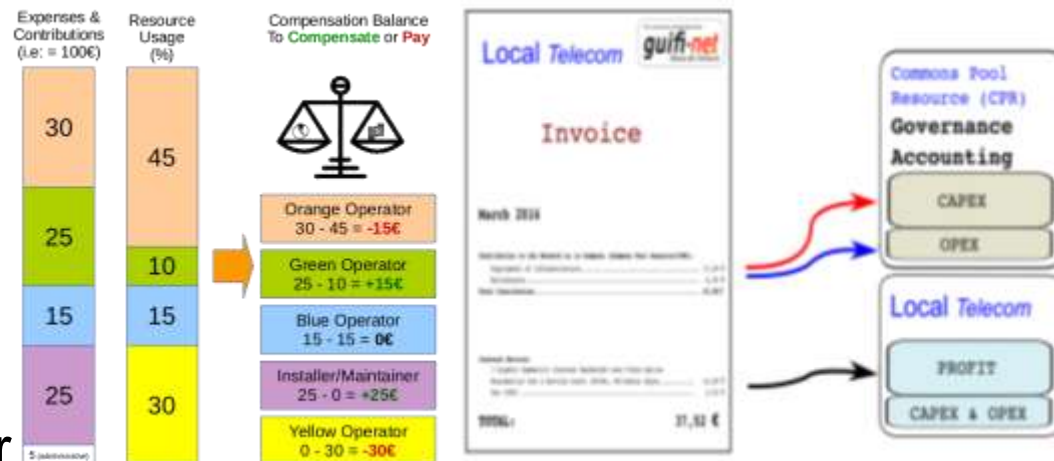
Community Networks in commons

Guifi.net, Spain. Telecoms Infrastructure as commons since 2004



Following guifi.net example:

- 100K users, 20+ operators
- Share common resources
- Compensation tables
- “Fair Trade” cost structure
- Dispute resolutions
- CAPEX 7M€, OPEX 3M€/year

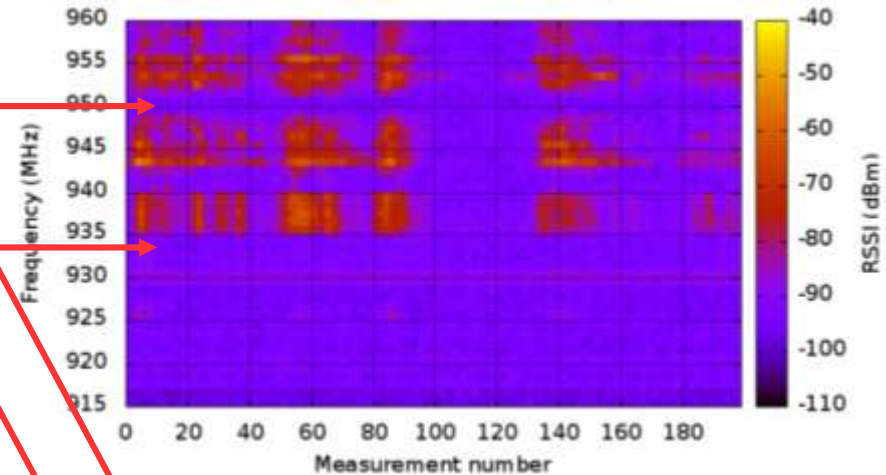


“Use or lose it” vs “Use it or share it”

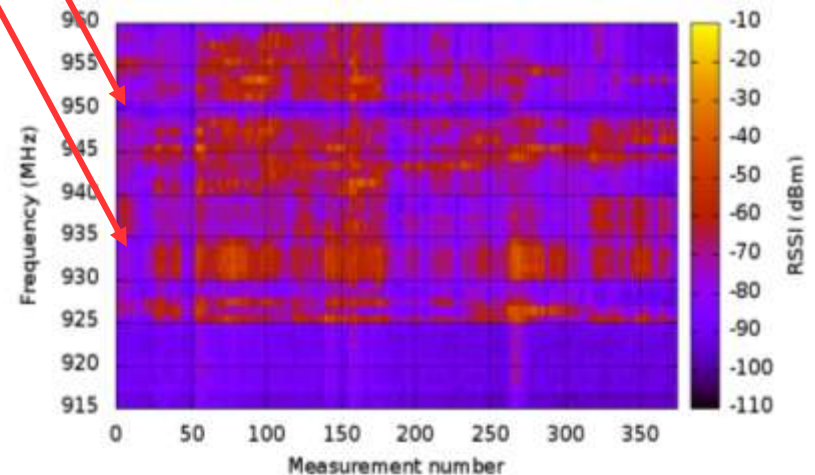
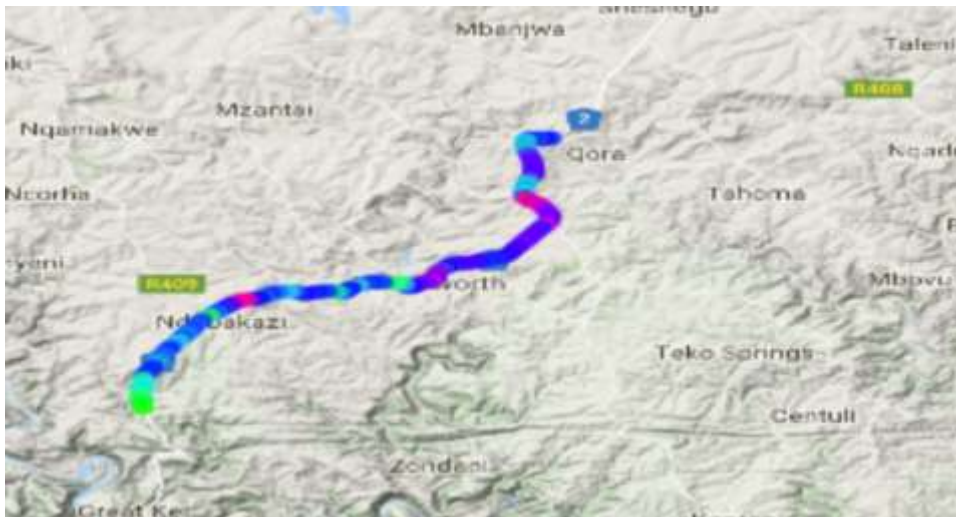
4km measurement / rural Eastern Cape



1.4 MHz empty
all over!
10 MHz empty
in deep rural!

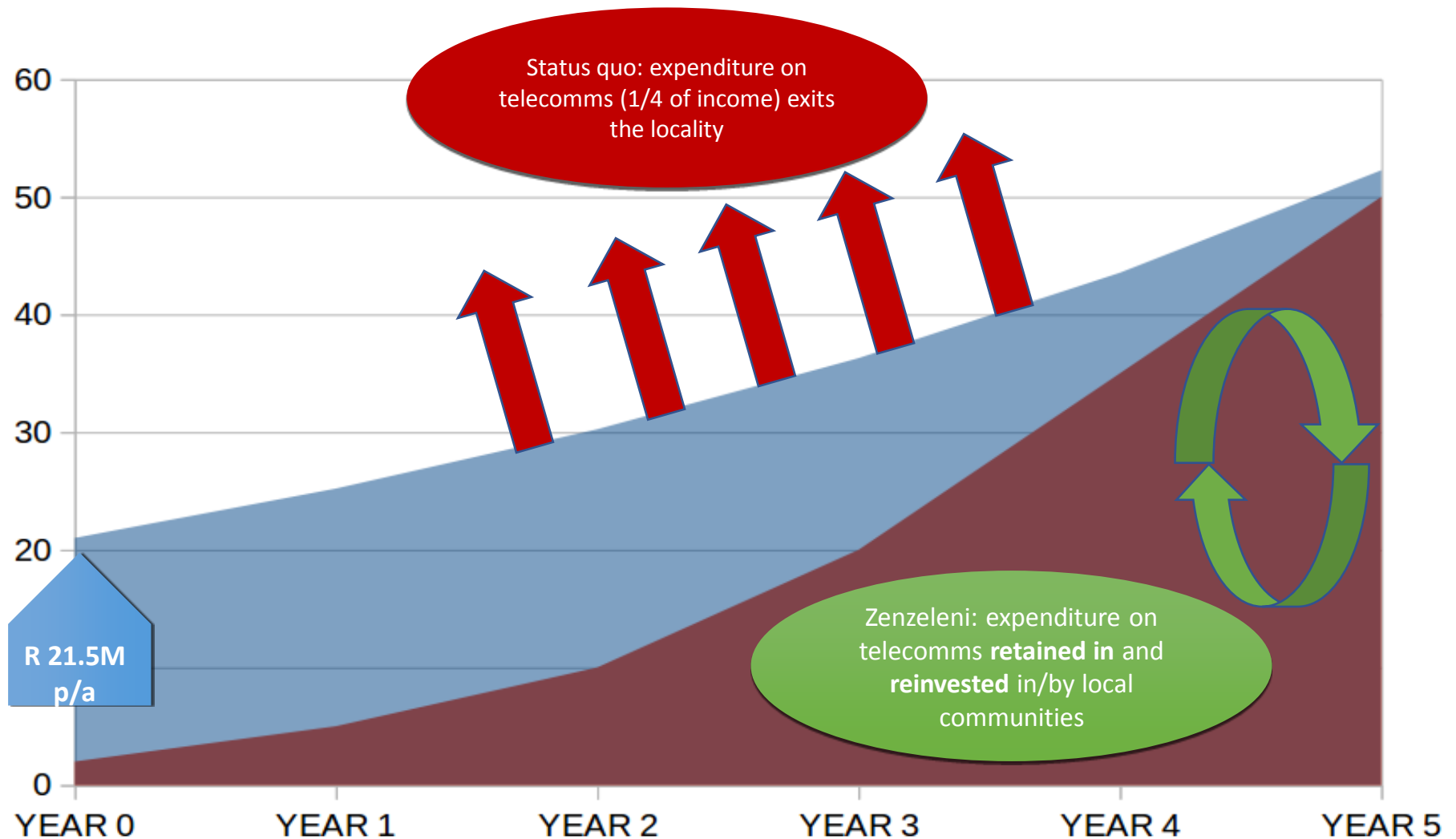


80km measurement / along the N2 (EC)

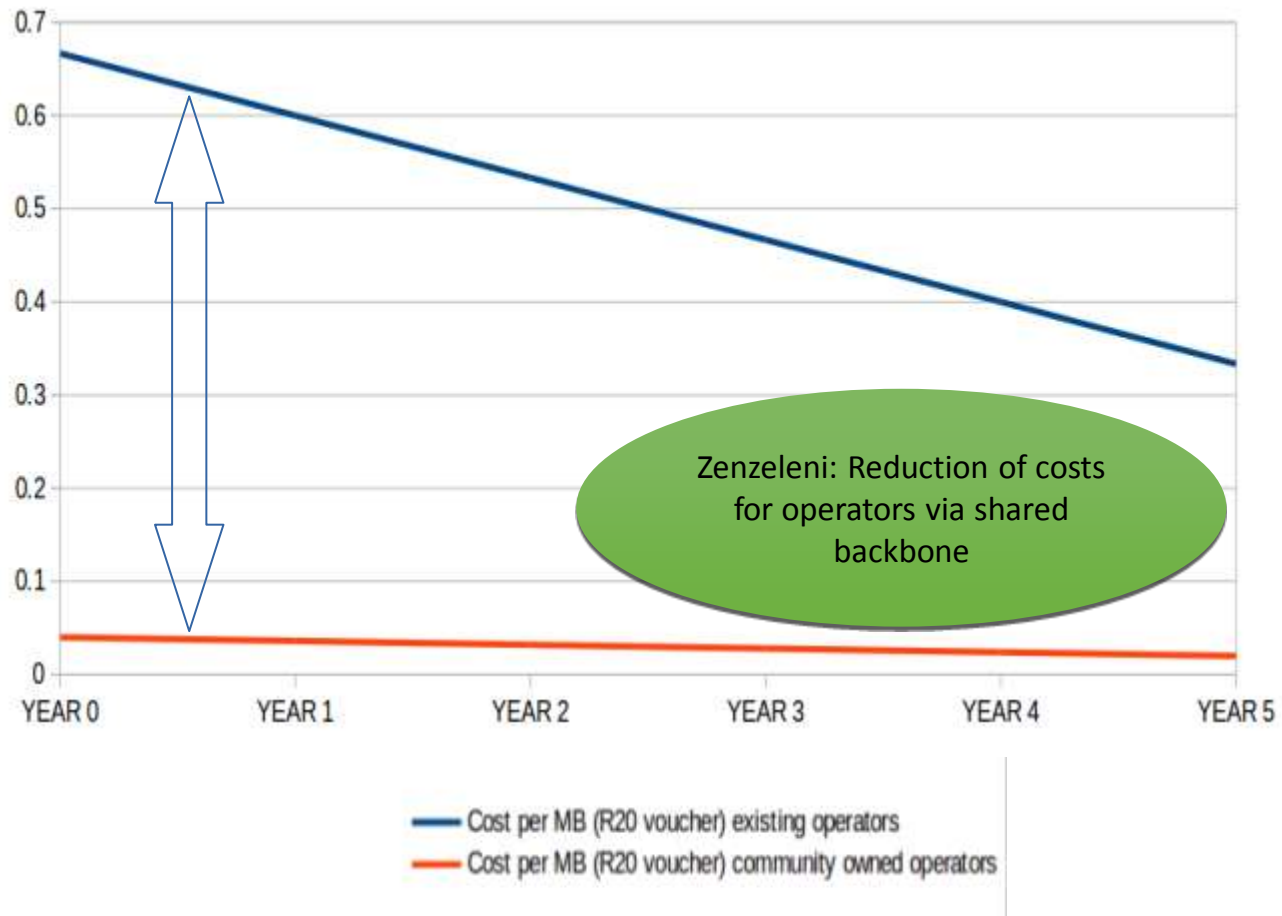


Expanding the provisions of Section 31C to allow sharing with no-spectrum owners

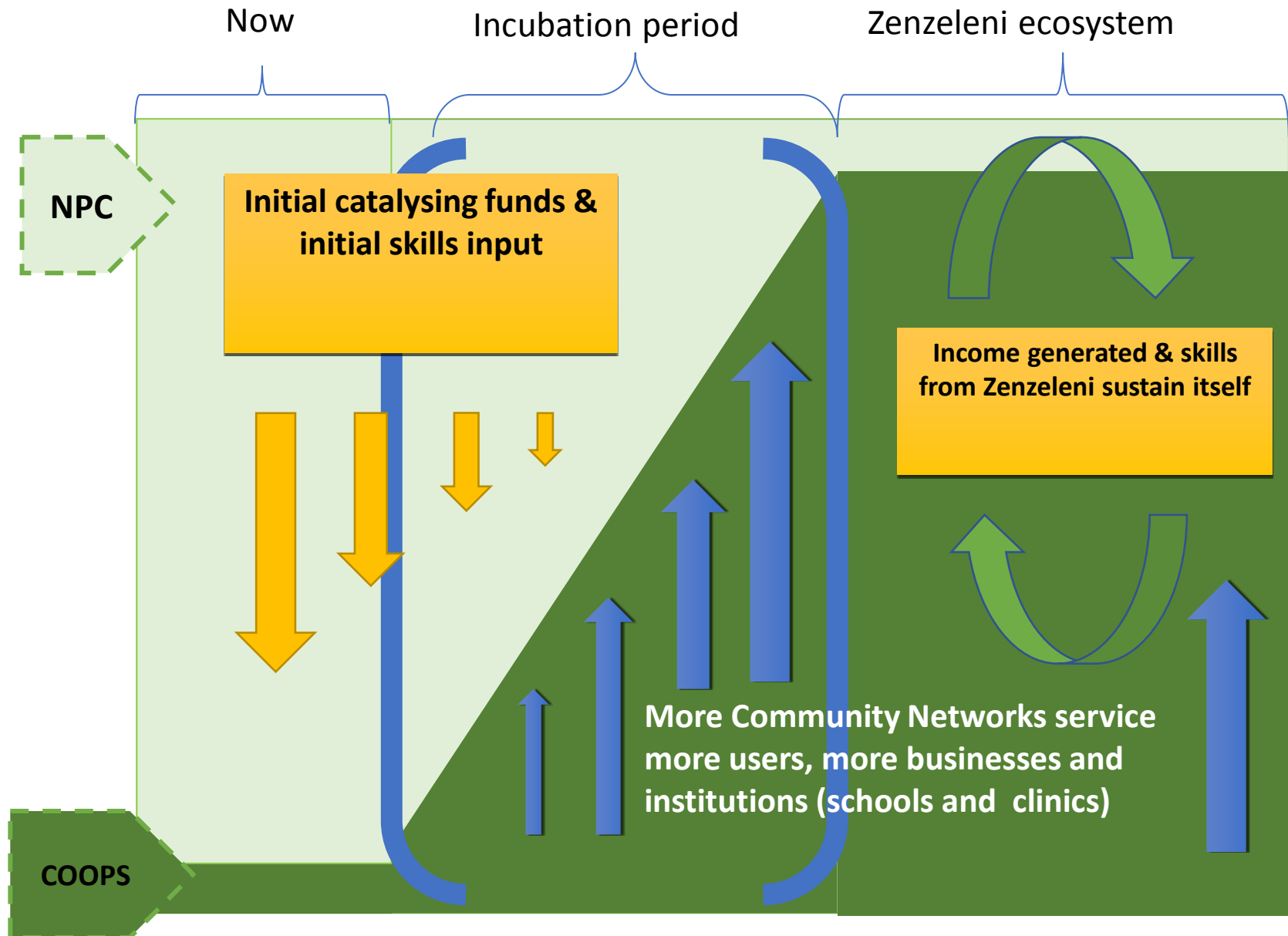
Zenzeleni Ownership: Retaining, re-investing



Zenzeleni: Affordable & Accessible



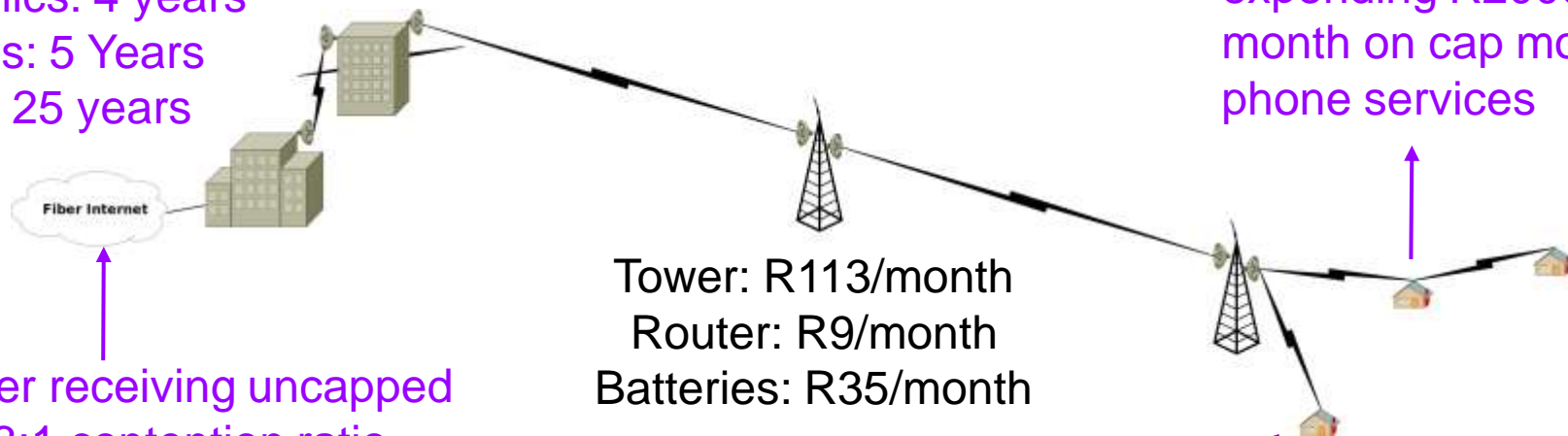
Zenzeleni: road to sustainability



1st Scenario

Each piece of equipment amortized during its lifespan (5% inflation):

- Electronics: 4 years
- Batteries: 5 Years
- Towers: 25 years



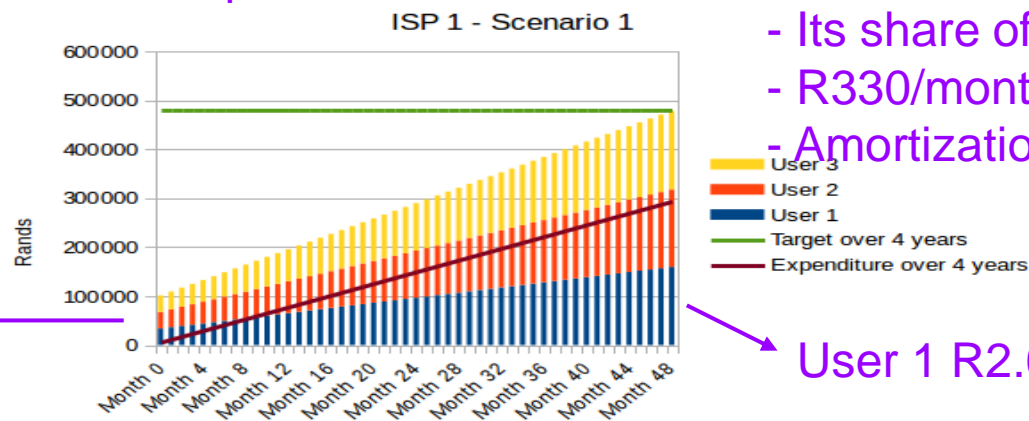
Each user currently expending R2000 a month on cap mobile phone services

Tower: R113/month
Router: R9/month
Batteries: R35/month

Each user receiving uncapped 5 Mbps 3:1 contention ratio
5 Mbps is minimum from fiber provider

Each user pays:

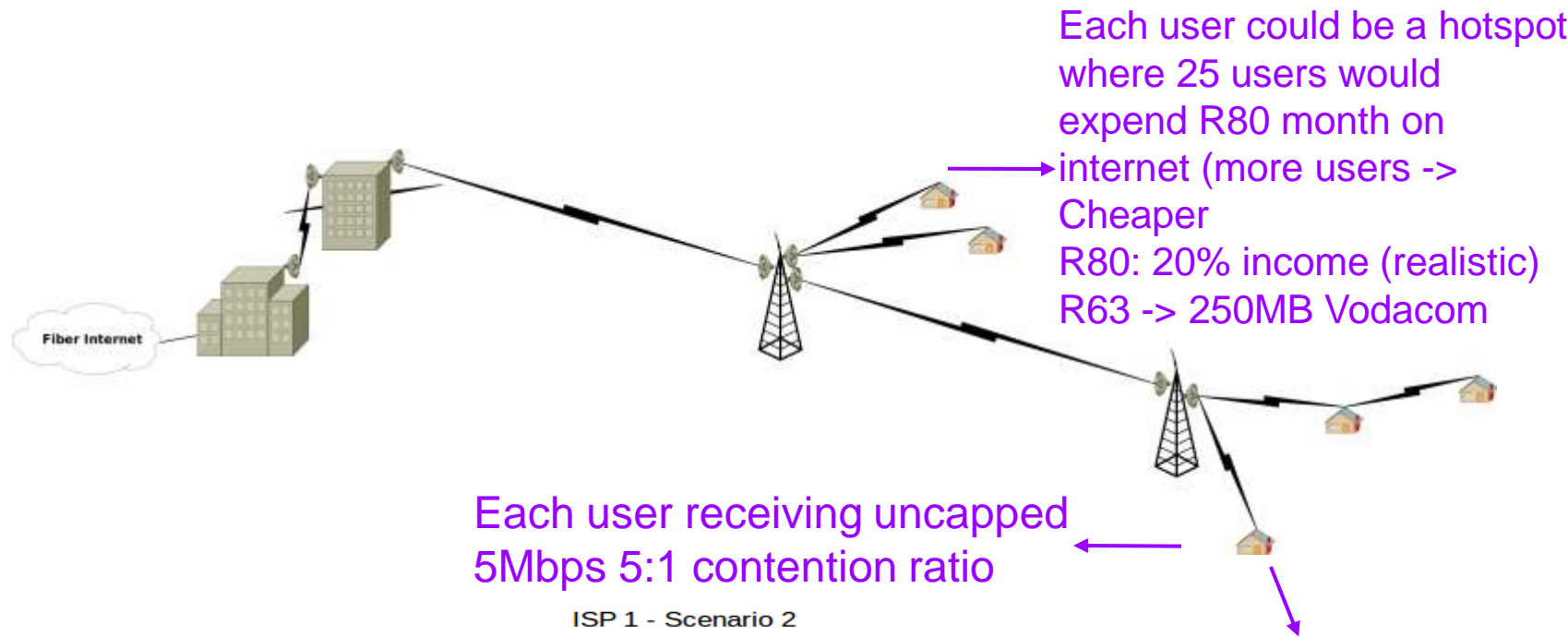
- Its share of Internet gateway
- R330/month maintenance
- Amortization of equipment used



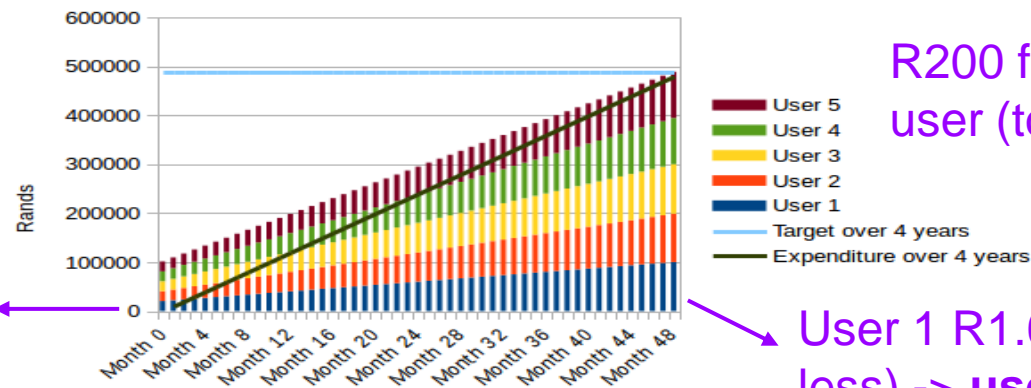
R101K initial CAPEX covered by users

User 1 R2.6K/month

2nd Scenario



ISP 1 - Scenario 2



R9K additional initial CAPEX

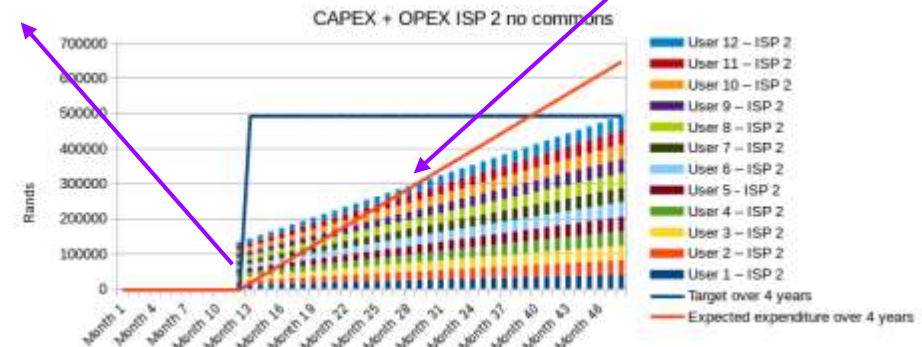
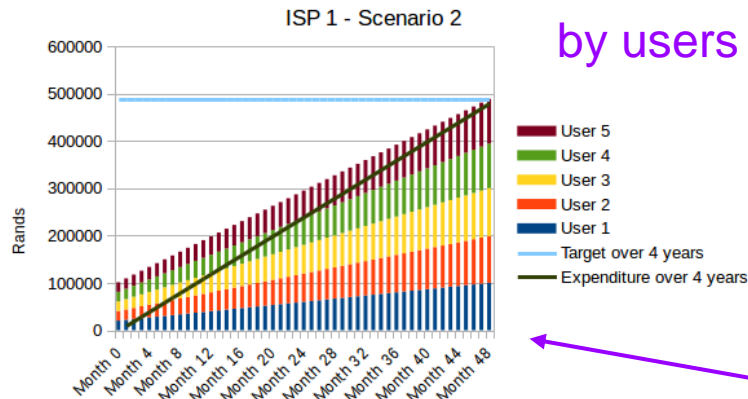
R200 for maintenance per user (total R1K/month)

User 1 R1.6K/month (1RK less) -> users interested on extending commons

3rd Scenario

Month 26
after start

R133K initial
CAPEX covered
by users



Users:

- sharing fiber provider
- 2*5Mbps @ R5.2K/month
- R200/month for maintenance

Each user receiving uncapped
5Mbps 12:1 contention ratio

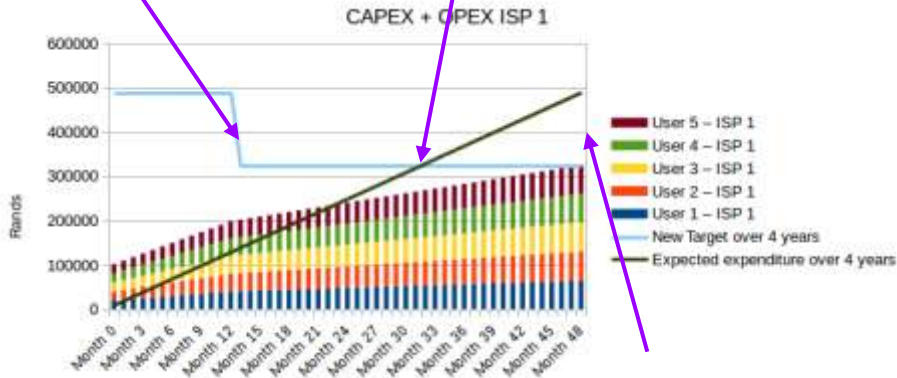
Each user currently
expending R1500K a
month on cap mobile
phone services

4th Scenario

Month 31 after start

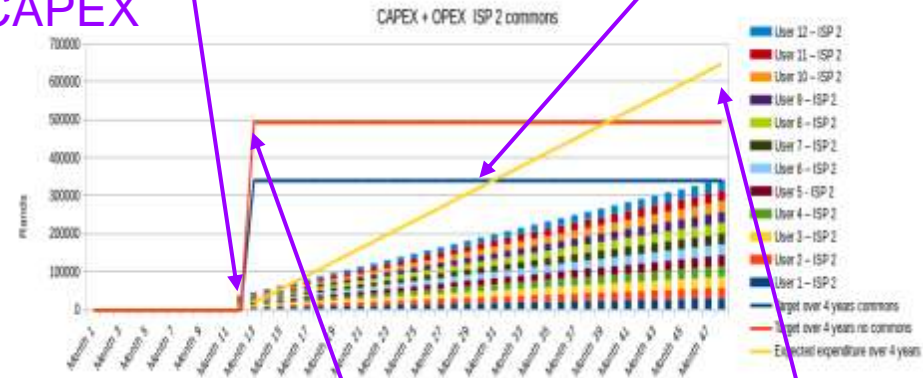
Month 19 after start
(7 months earlier)

R163K less in OPEX
over 3 years



R164K profit? Savings?

100K less in initial
CAPEX



R308K profit? Savings?

R151K less in OPEX
over 3 years

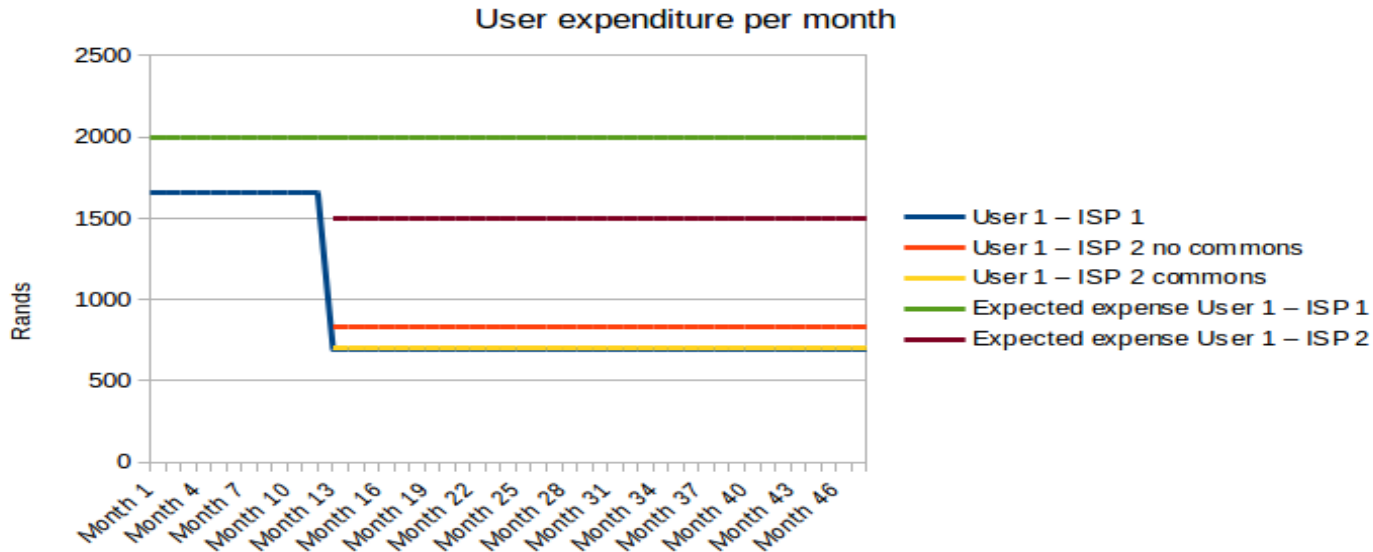


Fiber Pricing:

- R5.2K 5Mbps 1:1
- R5.9K 10Mbps 1:1

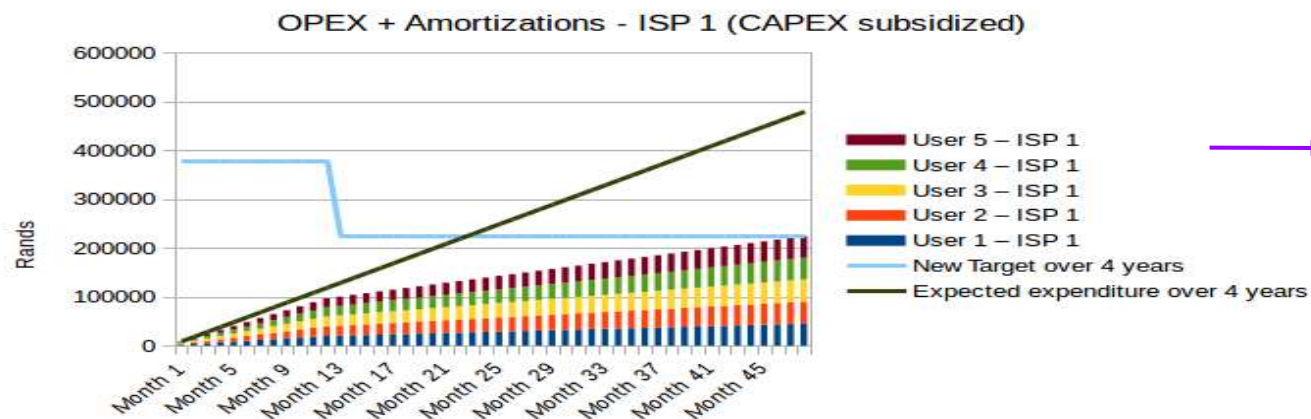
Operators interested on extending the commons

Monthly user expenditure (excluding initial CAPEX)



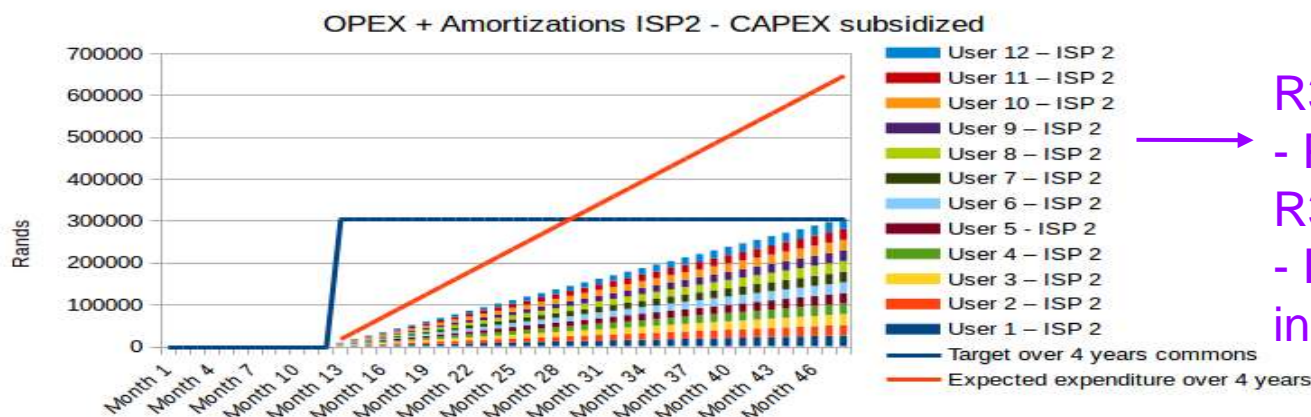
- 5 Users in Community 1:
 - From paying R2000/month for capped access to pay R700/month for 5Mbps 5:1 uncapped
- 12 Users in Community 2:
 - From paying R1500/month for capped access to pay R700/month for 5Mbps 12:1 uncapped
 - From paying R11K for initial CAPEX to pay R3K
- 5 Mbps/month, equivalent to: 1.62 TB/month

4th Scenario – CAPEX subsidized



ISP 1

R100K/R200K subsidy
 - Profit/Savings from R164K to R256K
 - Investment recovered in Month 23 (from M31)



ISP 2

R35K/R70K subsidy
 - Profit/Savings from R308K to R342K
 - Investment recovered in Month 17 (from M19)

Note: “savings” could/should be used for salaries at the local level and sustaining umbrella

Zenzeleni Networks:

A case study of a community network in rural South Africa

Dr. Carlos Rey-Moreno
carlos@apc.org

CRASA Workshop: “Reaching the unserved”

16th May 2018, Mauritius