

Africa's Energy Transition: An Opportunity for Development and Reducing Inequalities

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To access the materials presented today:

<http://rael.berkeley.edu>



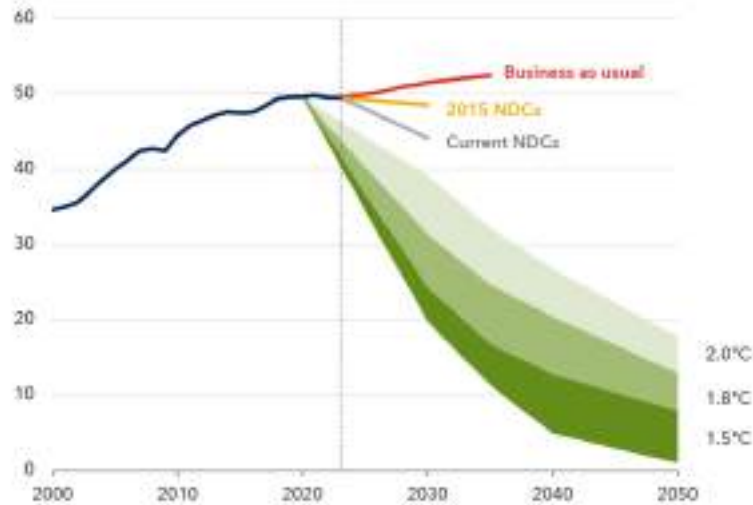
/ X @dan_kammen

The world is not on pace to protect the climate

Falling short

Current climate commitments will still only reduce global greenhouse gas emissions by 11% by 2030.

(global GHG emissions, GtCO₂e per year)

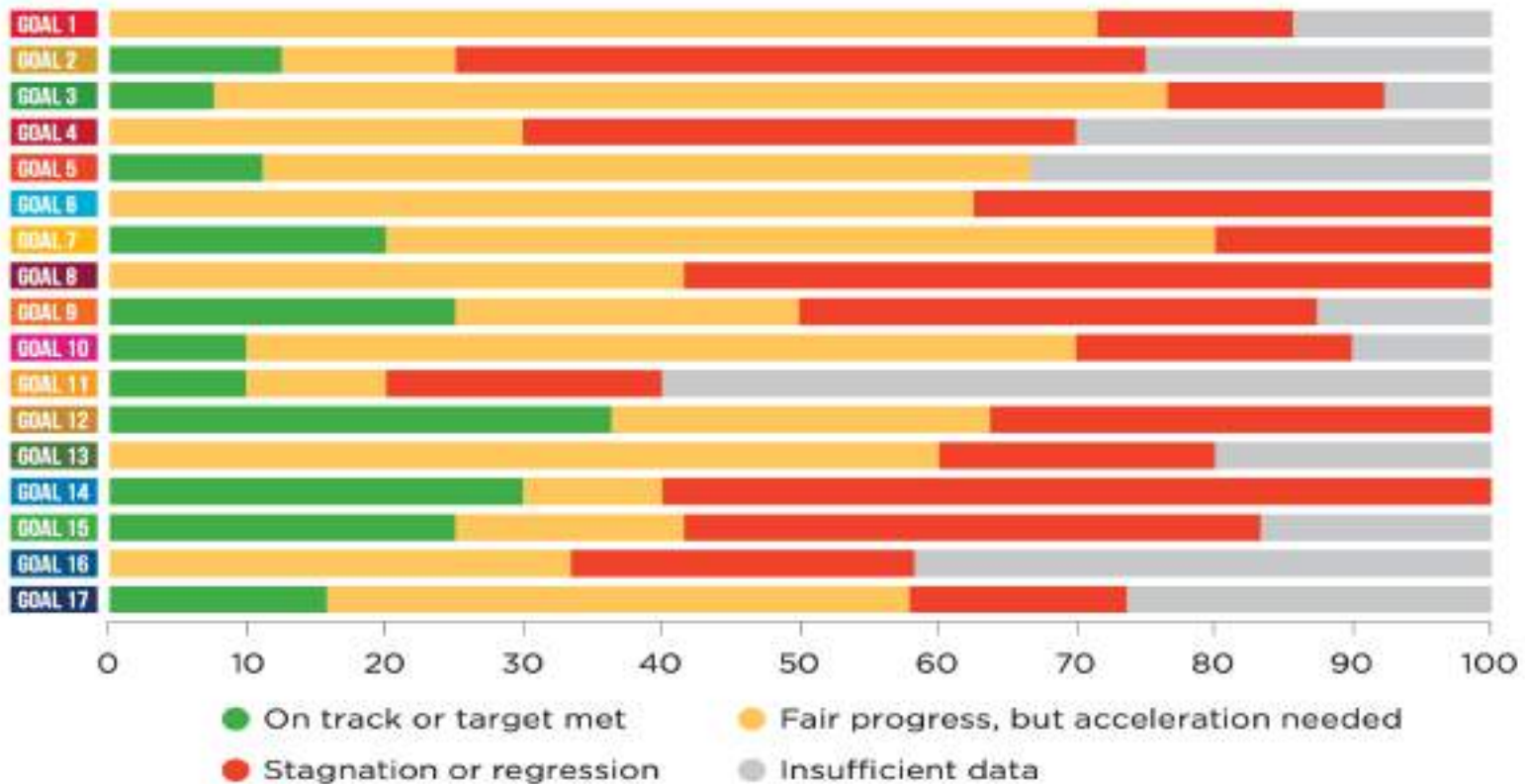


Sources: Intergovernmental Panel on Climate Change 2022, and IMF staff using CFAT.
Note: Excludes land use and land use change emissions. NDCs = Nationally determined contributions; GHG = greenhouse gas; GtCO₂e = Gigatonnes of carbon dioxide equivalent.

IMF

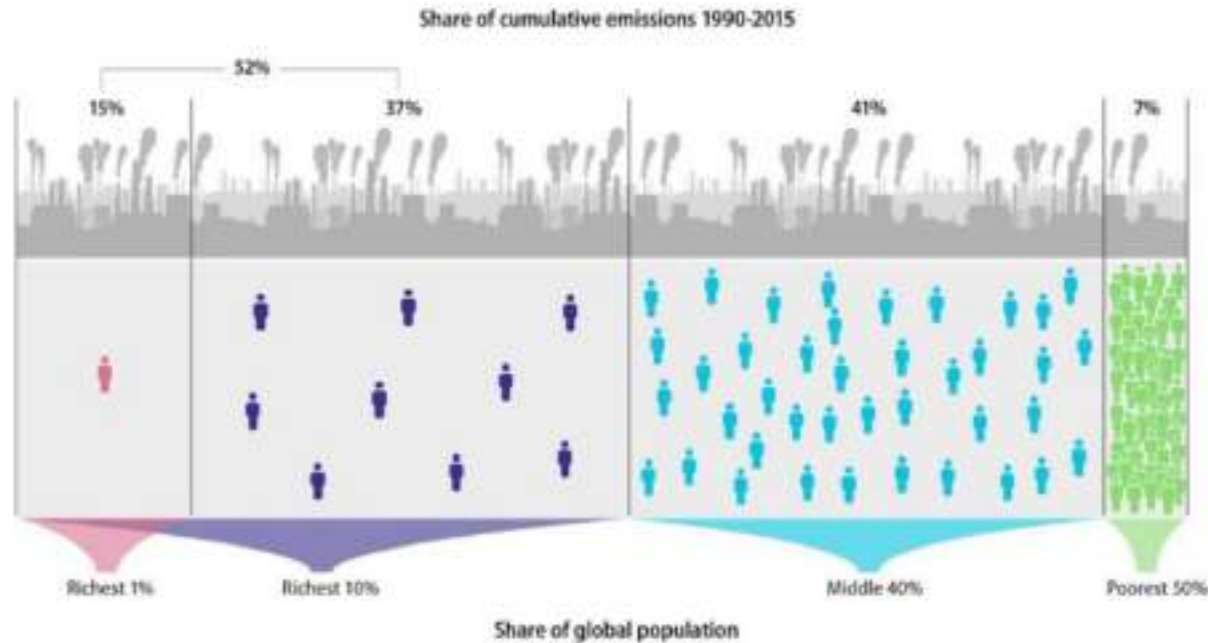
<https://www.imf.org/en/Blogs/Articles/2023/11/27/world-needs-more-policy-ambition-private-funds-and-innovation-to-meet-climate-goals>

Progress assessment for the 17 Goals based on assessed targets, 2023 or latest data (percentage)



<https://unstats.un.org/sdgs/report/2023/progress-chart/Progress-Chart-2023.pdf>

The future of climate protection is Justice (data: 1990 – 2015)



The richest 1% must reduce their emissions by a factor of *thirty* while the poorest can increase their emissions by a factor of *three* for the world to stay within the global carbon budget in a fair way.

This is arguably the most important finding of the past decade (or two).

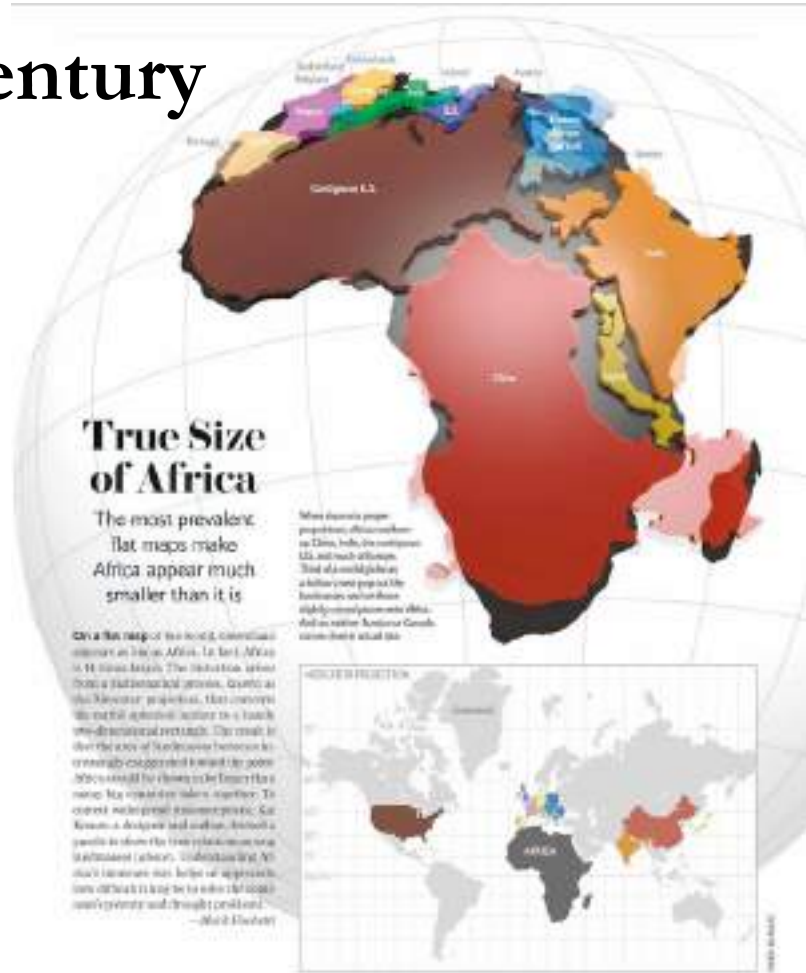


Africa as the cradle of 21st Century Sustainability Science

- Africa's population is booming. By 2100, it will be home to 4.4 billion people second only to the 4.8 billion projected for in Asia

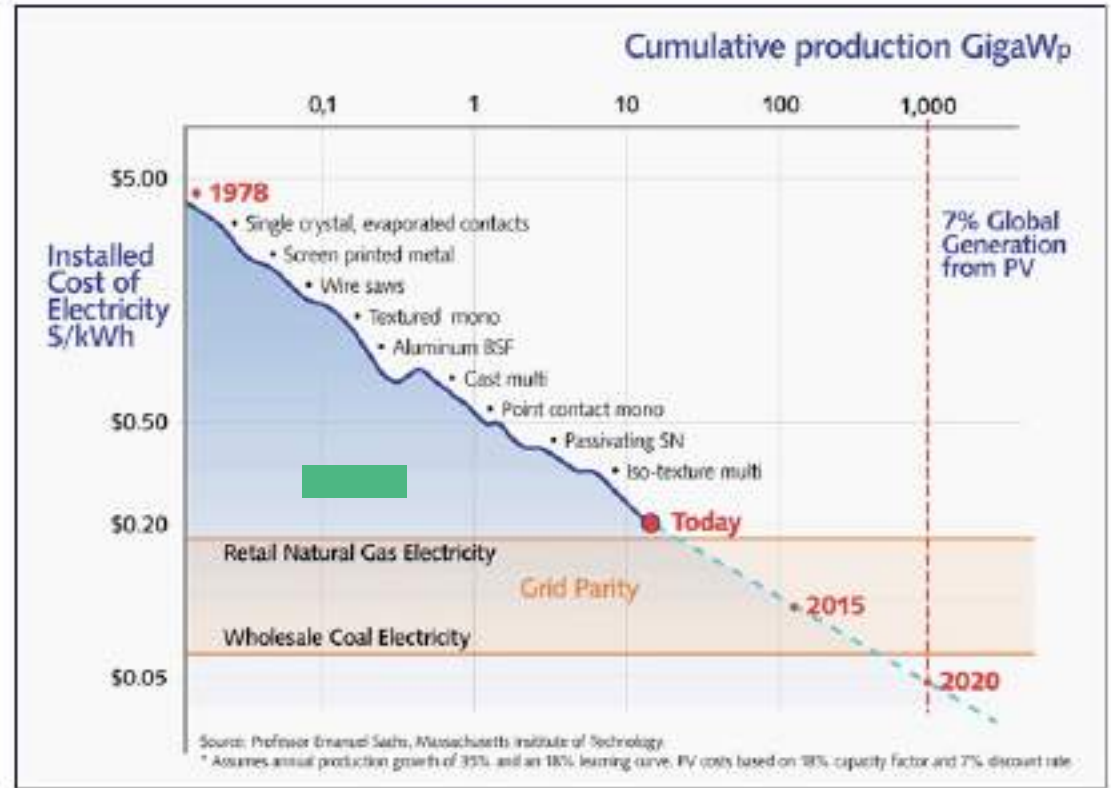
Today in Sub-Saharan Africa:

- One in three people are undernourished
- 590 million people live without electricity; meaning the majority of people rely on biomass to cook
- Less than one in five African women has access to education - increasing their chances of contracting AIDS and not immunizing their children
- More than one million people die from malaria each year - mostly children under the age of five



Solar cost decreases 10% per year

$$\frac{C_2}{C_1} = \left(\frac{V_2}{V_1}\right)^{-b}$$



Source: Professor Emanuel Sachs, Massachusetts Institute of Technology.

* Assumes annual production growth of 33% and an 18% learning curve. PV costs based on 18% capacity factor and 7% discount rate.

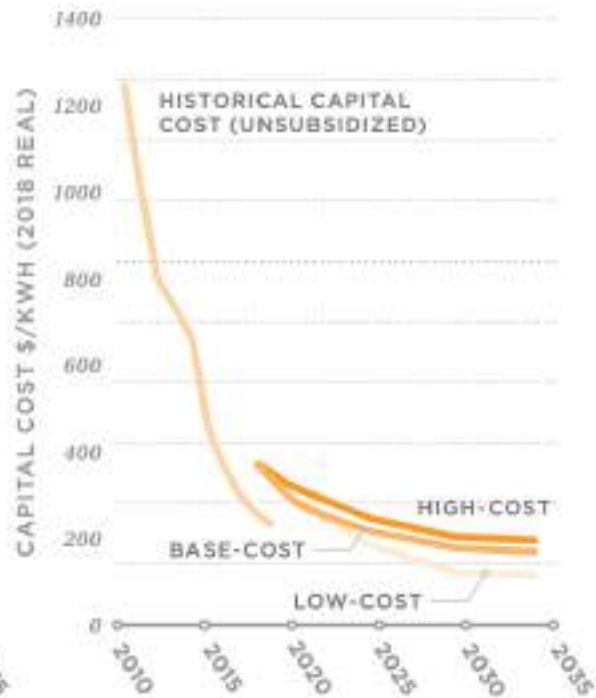
WIND LCOE



SOLAR LCOE



BATTERY STORAGE CAPITAL COST



Now cheaper to *build renewables* than to *operate fossil fuel power plants*

A new model vehicle is needed ... HETA To move from

This

to

This



A Global Movement with Local Partners

Launched by SEforALL and Power Africa in September 2021 at UN HLD-E



Goal: Electrify 10,000 health facilities by 2025 and ultimately 100,000



A social/technical strategy is needed for HETA



Photo: Power Africa/Justice Kalebe



Photo: Jeremy Weate

The Need

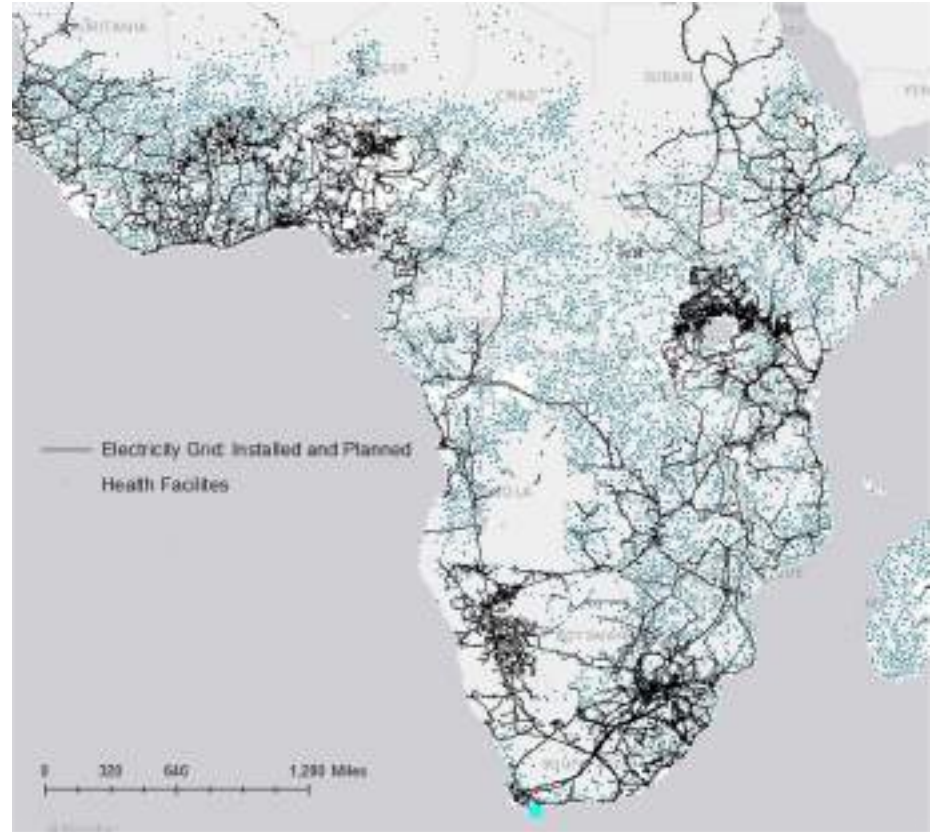


100,000 facilities (public) lack access to reliable or no power in SSA

Nearly **1 billion** globally served by health facilities without reliable electricity

\$5 billion is needed to achieve universal health electricity

Source: Recent Energizing Health report



Source: Kakoulaki, Georgia; Moner-Girona, Magda (2021)

HETA partnership countries ... and counting

HETA is a global development alliance

A partnership of:

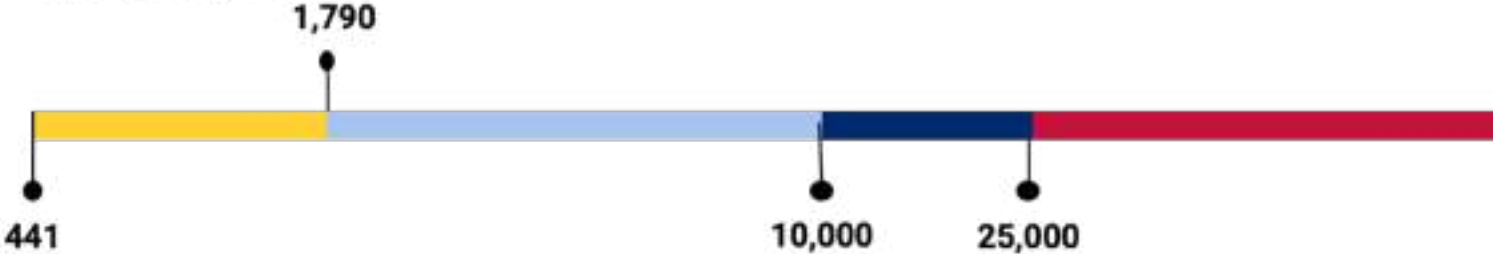
- funding agencies
- Host governments
- Multinational agencies
- Implementing partners
- University and think-tank developers



The sustainability challenge: technical, economics & social pathways and models for health-energy technology

Clinics electrified across SSA

Since 2020 by USAID



Market Based Solution
Models created that support health electrification beyond donor investment



HETA/ Multilateral HFE Compact

Power Africa committed to electrify 10,000 facilities under the Multilateral HFE Compact which aims to electricity 25,000 health facilities by 2025 through public-private partnerships



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A vision of solar+storage & IT health solutions



A vision of solar+storage & IT health solutions

Sensor deployment methodology



PowerWatch sensor
www.nLine.io

50 sensors deployed, 2 per HF

Measures:
Power interruptions
Duration of outages
Voltage spikes and sags
AC frequency

Uploads over cellular

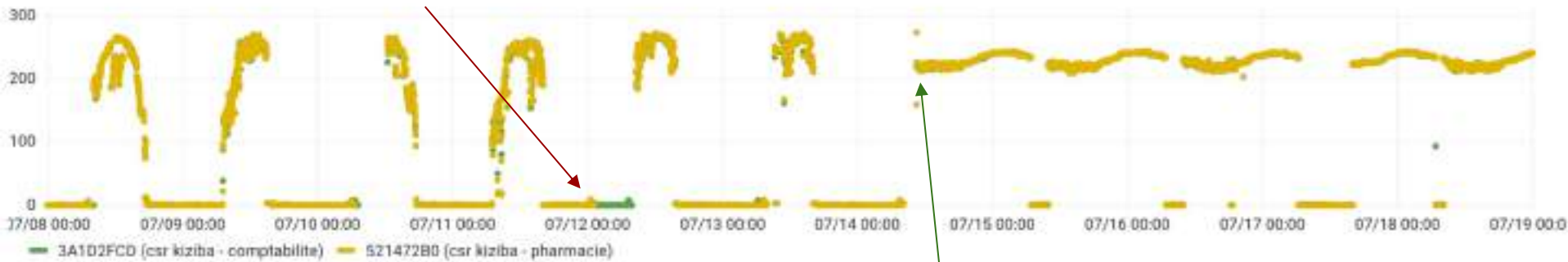
Companion participant app



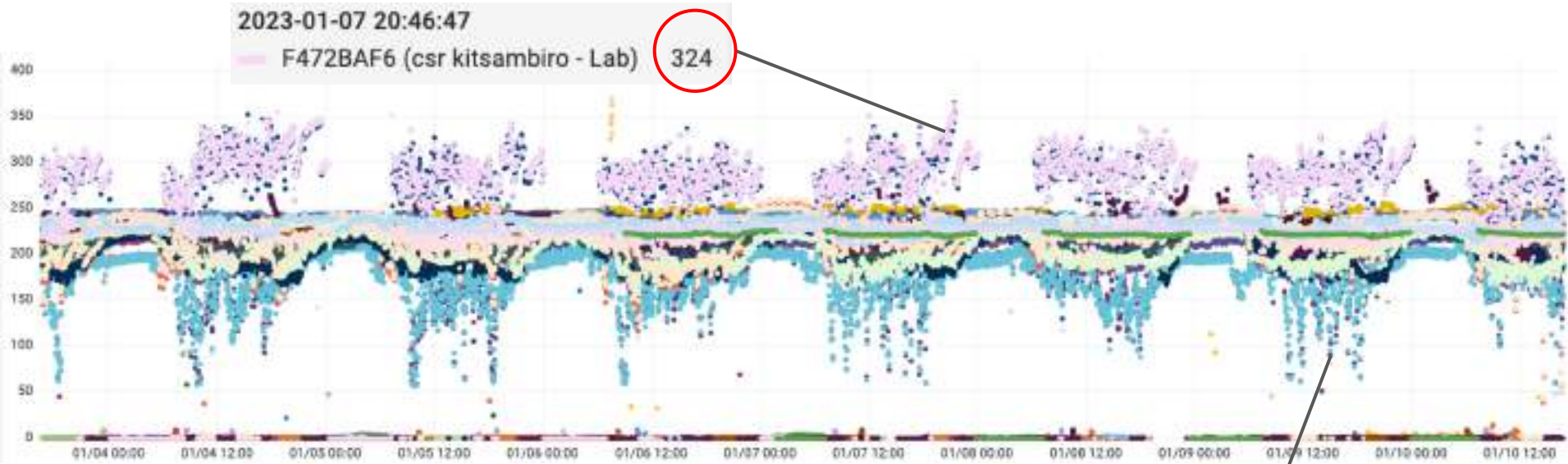
Real time monitoring enables connection verification & reliability monitoring of power at HETA sites (Goma, DRC)

Outage time

Voltage Time Series



Granular, live-view of outlet-level power quality

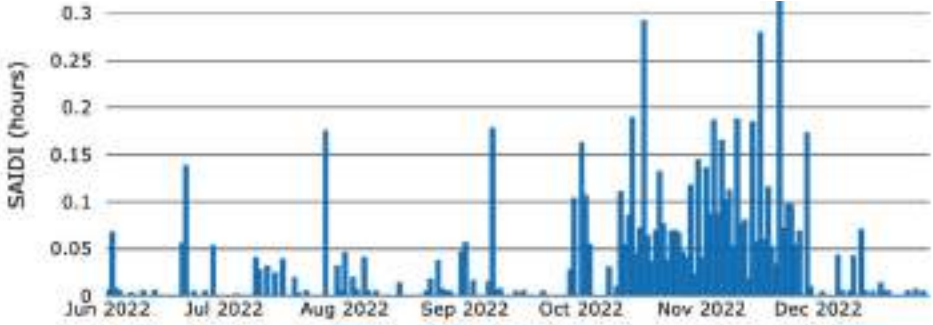


7 days of voltage at 25 HF's between Jan 1-10, 2023

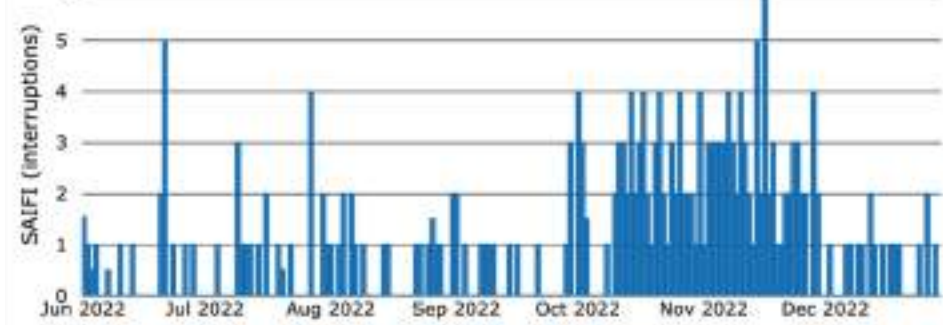
Hôpital Provincial – Goma, DRC



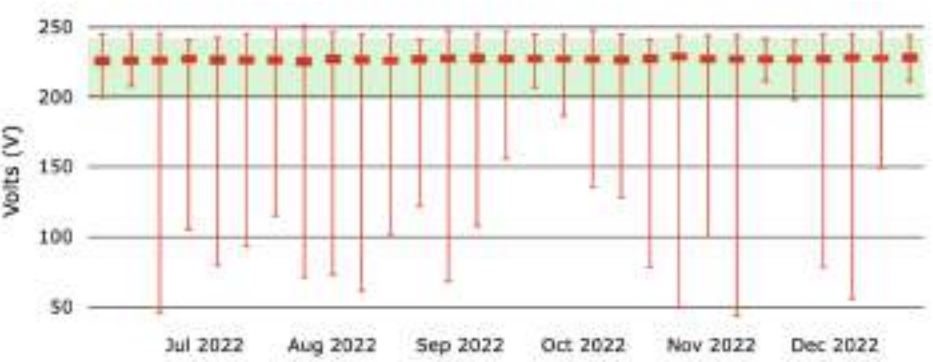
Hours without power / day



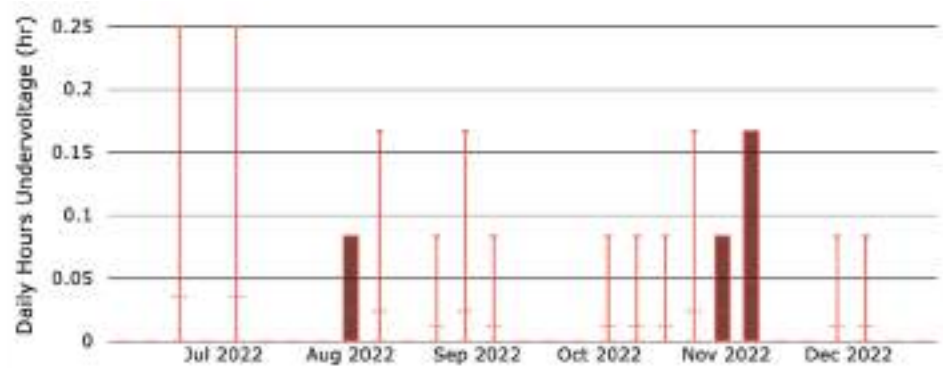
Number of interruptions / day



Voltage / week

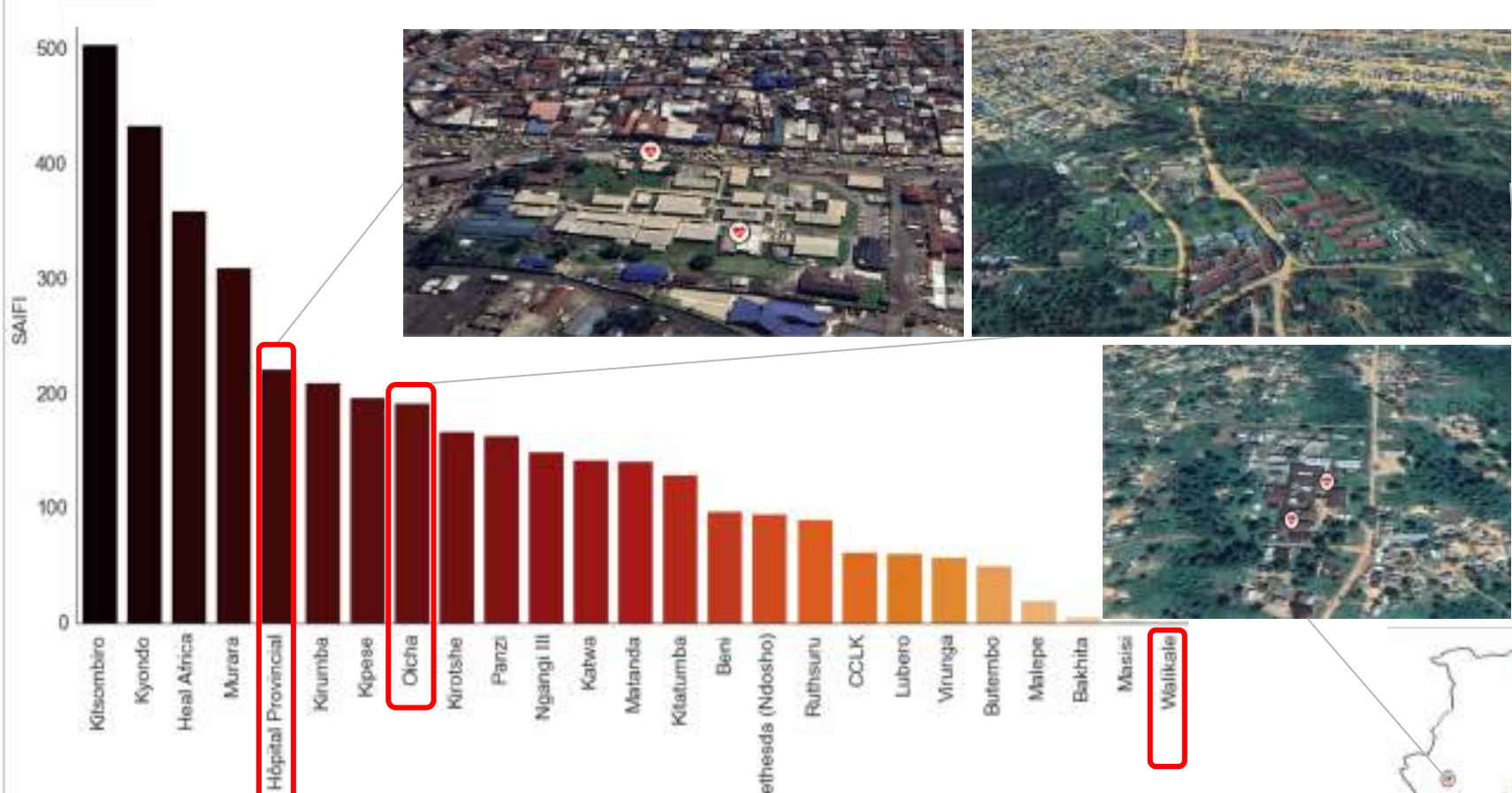


Hours undervoltage / week



HPNK has good power quality and short downtime thanks to auto-start generator - but still suffers from 1-4 interruptions/day

Reliability at three Hospitals



Diverse and Interdisciplinary Team

Hon. **Joshua W. Irungu**, Governor, Laikipia County

George Gichingiri, Senior Advisor, Economic Affairs, Laikipia County

Leah Njeri, County Program Officer, Laikipia County

Chris Kimanga, Energy Officer, Laikipia County

Nancy Chege, Country Programme Manager,
GEF Small Grants Programme (SGP), UNDP

James Mema, Indigenous Movement for Peace Advancement
& Conflict Transformation (IMPACT Trust)

Daniel Kammen, Professor of Sustainability, UC Berkeley, USA

Misbath Daouda, Asst. Professor of Public Health, UC Berkeley, USA



**June 17, 2023:
Planning Meeting,
Nanyuki, Kenya**

Kenya Solar Installation Map and Health Facilities in Laikipia, Kenya



Left: Kenya grid and solar installation map;

Right: Map of health facilities in Laikipia County, Kenya.

Source: Moner-Girona and Kammen, *in preparation*.



Dr. John N. Nkengasong
Ambassador –
at-Large
US Global
Aids
Coordinator



Male Ole Kaunga
Executive Director,
Indigenous Movement for
Peace Advancement &
Conflict Transformation
(IMPACT)



Translational
Science / EJ



Africa Climate Summit meeting (L to R)
Nancy Chege (UNDP/GEF SGP National Coordinator)
Achim Steiner (UNDP Secretary General)
Dan Kammen (UC Berkeley / USAID)
Anthony Ngororano (UNDP Resident Representative)



February 20 – 24, 2024 HETA+ Workshop, Nanyuki, Kenya



Meeting with Carlotte Ruto, Youth Energy Summit leader at the Powering Africa Summit - Washington, DC, March, 2024



Many Synergies: HETA & Ethnomedicine

Laboratory test equipment
for compound quality assurance



Lighting to safeguard inventory,
& serve kiosk staff and customers



Cold chain to manage inventory and extend
ethnomedical compound lifetimes

Expanding low-cost medical capacity
with proven ethnomedical compounds

Many Synergies: HETA & Ethnomedicine

Electric fencing for security
and wildlife warning(s)



Charging electric vehicles for harvesting plants
in remote locations



Diverse entry points for HETA+ training
and employment

Wifi for communicating with remote patients

From HETA to HETA+ to address a critical missing component: Engaging and centering Community and Traditional Medicine



We seek support and partners for Laikipia HETA+

- **Phase 1**: A 2 - 3 year pilot of 6 – 10 clinics (\$US500,000+) for clinic, ethnomedicine and team learning
- **Phase 2**: A 3 – 6 year full health facility roll-out (135+ facilities) from dispensaries to clinics to major centers
- Ongoing engagement and learning for local team and other HETA nations
- Ongoing evaluation of health outcomes and wider SDG acceleration



HETA+ accelerates climate and development goals, and integrates health, climate and SDG goals

Some funding models ...



A new mechanism to catalyse distributed renewable energy

Research shows that accessing finance is a critical barrier limiting mobile tower owners from adopting on-site renewable energy solutions. Typical fossil fuel powered solutions like diesel generators are relatively cheap to buy; the materials are readily available, and the installation and maintenance processes needed to operate the solutions are well established. However,

www.heta.org

<https://www.gsma.com>



PREC PROJECTS AVAILABLE TO SUPPORT

- 1. Solar Power
- 2. Wind Power
- 3. Hydro Power



<https://www.energypeacepartners.com/prec>

THANK YOU

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